JANUARY 1954

PRECISION METAL MOLDING

INCLUDING DIE CASTINGS MAGAZINE

DIE CASTINGS
INVESTMENT CASTINGS
POWDER METALLURGY
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PLASTER MOLD CASTINGS
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PMM

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TO SERVE YOU BETTER . . .
CERTIFIED Announces the construction of a new alloying plant at Los Angeles (Rivera,) California

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ZINC DIE CASTING ALLOYS

Our new modern alloy plant is now producing quality controlled ZAMAK zinc alloys. Its production will add to the total output of our Cleveland plant and will enable us to provide prompt nationwide service on all requirements. For dependable deliveries of uniform ingots in any quantity, phone or write to

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ALUMINUM ALLOYS

For Die Casting, Permanent Mold and Sand Casting

Whatever casting process you use you'll get sounder, more uniform castings when you use White Star brand quality controlled aluminum alloys. Quality is always uniform, a complete metallurgical laboratory and skilled technicians using the finest techniques and latest devices obtainable double check each melt to guarantee that each ingot meets your specific requirements. For top quality ingots and prompt service write or phone

Aluminum Smelting & Refining Co., Inc.

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DIE SET-UP

Easier! Faster! Safer!...

WITH

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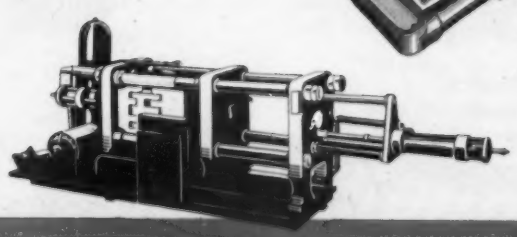
DIE-CASTING MACHINES

Built-in Rack and Pinion permits use of a ratchet wrench to quickly move the complete die-locking assembly in place to accommodate various sizes of dies.

Die-Lock Valve can be shut off and by-passed, with Inching Valve assuring added safety when setting up die. This permits instantaneous, micromatic control.



Faster set-up time is just one of the many "bonus" features which make Cast-Master today's outstanding choice in die-casting machines. To get the complete "bonus" story, send for the Cast-Master catalog, containing illustrations and specifications on eight new models.

SEND FOR CATALOG TODAY!

CAST-MASTER *Inc.* 2123 HAMILTON AVE. CLEVELAND 14, OHIO

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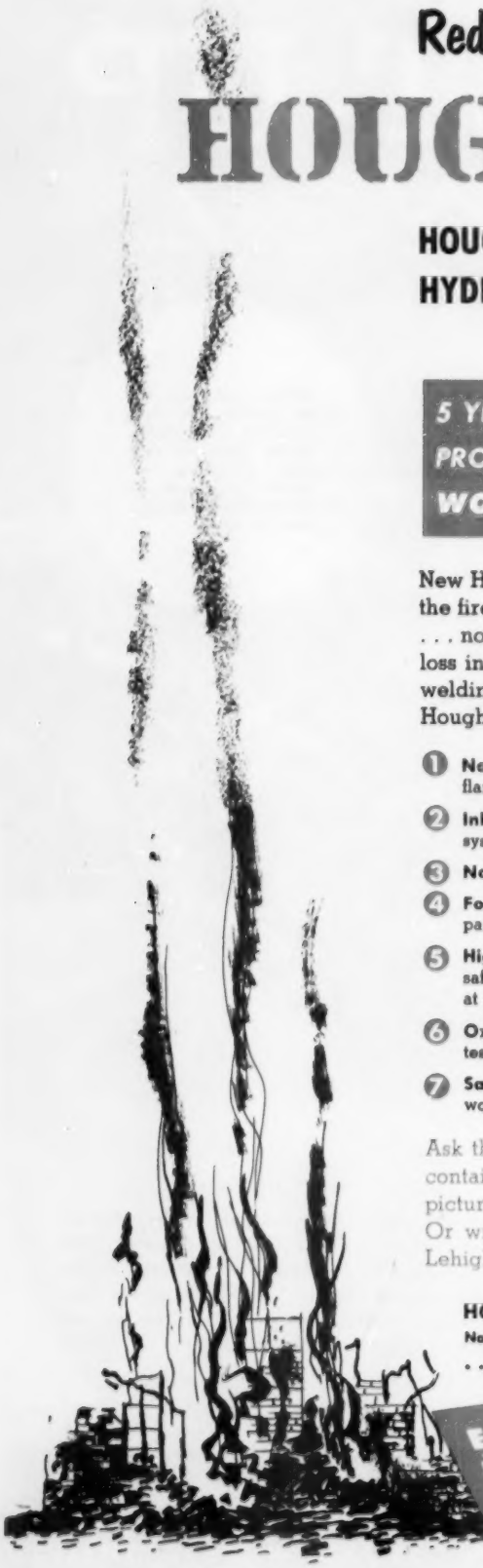
Reduce fire hazards---use new

HOUGHTO-SAFE

HOUGHTON'S NON-FLAMMABLE HYDRAULIC FLUID

5 YEARS IN THE LAB—2 YEARS IN PLANTS—PROTECTS BOTH MEN AND MACHINES . . . WON'T ATTACK PACKINGS!



New Houghto-Safe hydraulic fluid . . . rated "Acceptable from the fire hazard standpoint" by the Factory Mutual Laboratories . . . now proves fire-resistant qualities can be obtained without loss in operating efficiency! In plants performing die casting, welding, hot press forging and other hydraulic operations, Houghto-Safe offers 7-way safety . . .

1. **Non-Flammable**—won't burn or explode even when sprayed into open flames.
2. **Inhibited Against Corrosion**—new Houghton formula keeps hydraulic systems safe from corrosion and rust.
3. **Non-Toxic**—safe for workers to handle; has no unpleasant odor.
4. **Fortified Lubricity Saves Equipment**—high film strength gives metal parts greater protection against undue wear.
5. **High Viscosity Index Reduces Wear**—viscosity index of 150 assures safe operation at all normal temperatures—won't freeze—pumps easily at zero without preheating.
6. **Oxidation Stability Adds Extra Life**—proved by over 5500 hours of testing in laboratory equipment.
7. **Safe for Packings**—has no ill effect on synthetic rubber packings—won't attack them or impair their efficiency.

Ask the Houghton Man for our new bulletin containing research data, case histories and pictured proof of Houghto-Safe's efficiency. Or write to E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

HOUGHTO-SAFE
Non-Flammable Hydraulic Fluid
. . . a product of

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PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

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JANUARY 1954
Vol. 12 No. 1

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PRECISION METAL MOLDING

DIE CASTINGS • INVESTMENT CASTINGS • PLASTER MOLD CASTINGS

PERMANENT MOLD CASTINGS • POWDER METALLURGY • SHELL MOLDINGS

CONTENTS

LETTERS TO THE EDITOR 4
BETWEEN THE LINES 8
REFERENCE MATERIAL in this month's ads 16
TRENDS AND PEOPLE in the news 22
MORE DIE CASTINGS FOR MEDICS 31
DENTISTS BUY IMPROVED PERFORMANCE AND STYLE 32
BERYLLIUM COPPER INVESTMENT CASTINGS for strength plus surface 33
Here's How ALUMINUM DIE CASTINGS ARE WELDED IN PRODUCTION 34
CORED SLOTS PLUS PINS CAST AS INSERTS give bayonet lock 36
DEPENDABLE, LOW COST POWDERED METAL SUPPLY 37
YOU CAN USE LEAD where precision dimensions and weight are needed 38
Mercast valve body shows how BOOKING ALLOWS MORE DESIGN LATITUDE 40
COPPER BASE CONTINUOUS CASTINGS 44
Chuck Jaws — HALF PRICE BY POWDER METALLURGY 48
LOW INERTIA FLYWHEEL using new materials 50
Reduced machining allows TOOL WRITE-OFF IN 50 CASTINGS 55
THESE HOIST DESIGNERS GET A LIFT from low-cost zinc die castings 75
INDUSTRY NEWS 77
OPPORTUNITIES 83
SIMPLIFIED SOLUTIONS for Production Problems 89

FINISHING SECTION

Metallic Sealing Compounds Can Be Used For PRODUCTION IMPREGNATION 59
Company Reports Operating Characteristics of NEW BRIGHT COPPER PROCESS 63
USEFUL LITERATURE 66
NEW PRODUCTS 68

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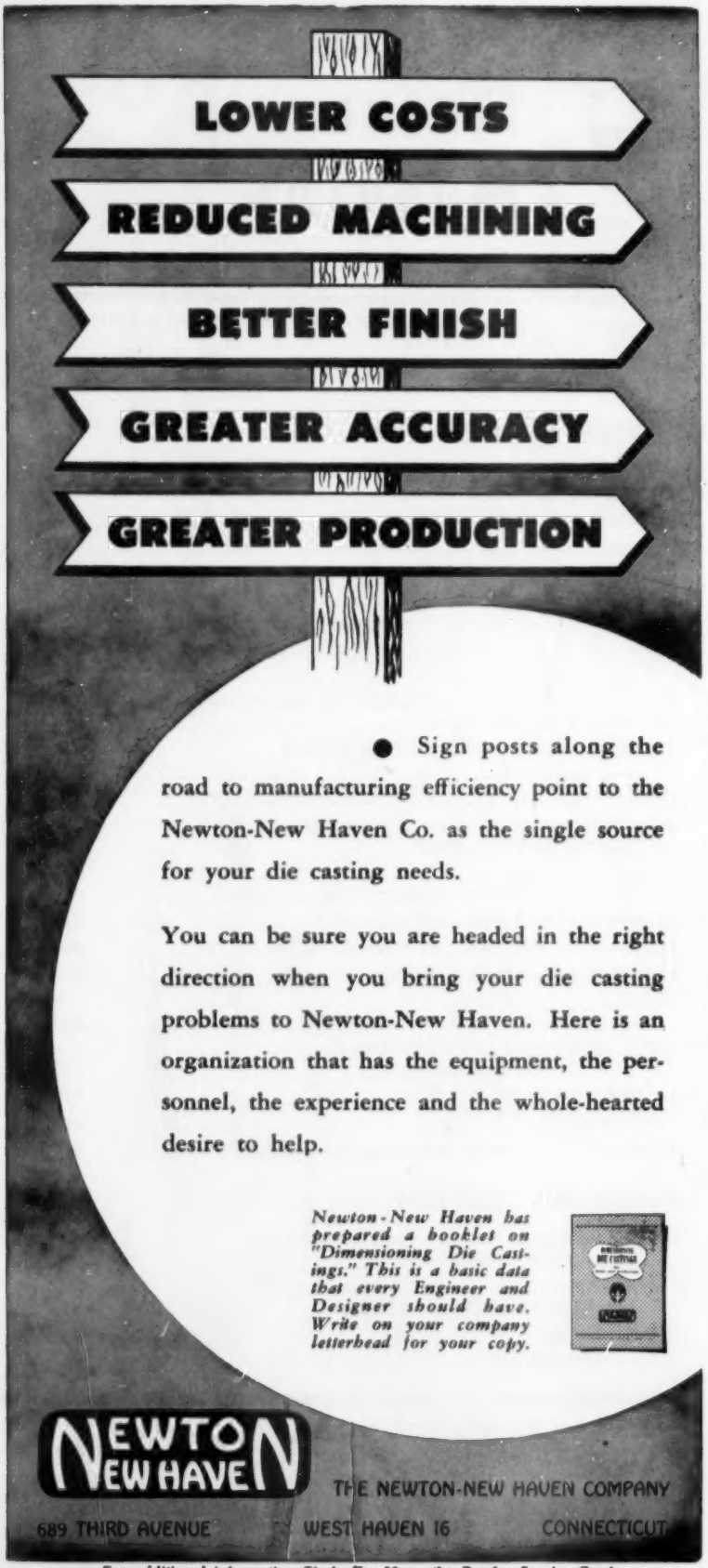

● Sign posts along the road to manufacturing efficiency point to the Newton-New Haven Co. as the single source for your die casting needs.

You can be sure you are headed in the right direction when you bring your die casting problems to Newton-New Haven. Here is an organization that has the equipment, the personnel, the experience and the whole-hearted desire to help.

Newton-New Haven has prepared a booklet on "Dimensioning Die Castings." This is a basic data that every Engineer and Designer should have. Write on your company letterhead for your copy.

NEWTON NEW HAVEN

THE NEWTON-NEW HAVEN COMPANY

689 THIRD AVENUE WEST HAVEN 16 CONNECTICUT

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LETTERS TO THE EDITOR

DIE CASTING INSTITUTE

I would like to have information about the Die Cast Convention as to when it is being held and where. Do you have to be a member of this organization to be qualified to attend? If so, I would like to know the amount of membership fee required to become a member. — E. W. (Die Cast Foreman)

The American Die Casting Institute is the organization of commercial die casting companies which celebrated its 25th anniversary in September. Membership is open to companies doing contract die casting work. Details concerning eligibility can be obtained by writing to David Laine, Secretary, The American Die Casting Institute, 366 Madison Ave., New York 17, N. Y.

Annual meetings of the Institute are always held in September in Chicago, although regional meetings are held at frequent intervals. — Ed.

SOURCES . . . SOURCES

In your September issue, Page 48, you showed a zinc pipe plug.

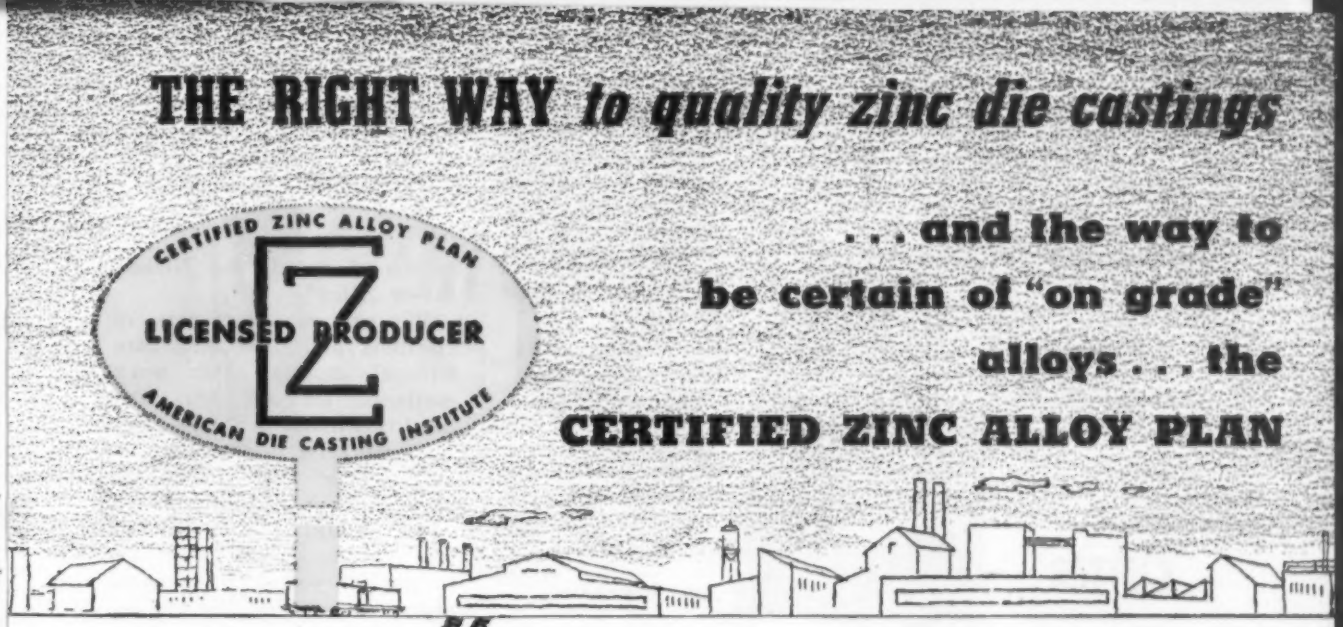
We would be interested in having the name of the organization that makes these pipe plugs in sizes from ⅛" up to 2". — T. M. S. (purchasing Department)

We are interested in brass die-castings for plumbing parts and would appreciate it if you could help us find brass die-casters in New York, New Jersey, Conn. or Mass. area. — L. M.

Could you help us obtain a

continued on page 6

THE RIGHT WAY *to quality zinc die castings*



. . . and the way to be certain of "on grade" alloys . . . the CERTIFIED ZINC ALLOY PLAN

You're on sure ground when your die castings are made by a CZ Licensed Producer. No matter what your requirements, the **CZ Alloy Plan,** through constant periodic inspection and testing, guarantees their fulfillment with the proper alloy.

Any of the leading die casting firms listed here, the only licensed **CZ Alloy Plan** producers, will be glad to explain the plan to you or discuss any die casting problem you may have. A free folder, outlining in full the operation of the **CZ Alloy Plan,** will be sent upon request.

LICENSEES under the CZ ALLOY PLAN

A & A Die Casting Co., West Los Angeles, Calif.
The Accurate Die Casting Co., Cleveland, Ohio
Advance Pressure Castings, Inc., Brooklyn, N. Y.
Advance Tool & Die Casting Company, Milwaukee, Wis.
Badger Die Casting Corp., Milwaukee, Wis.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Cleveland Hardware & Forging Co., Cleveland, Ohio
Congress Drives Division, Tann Corp., Detroit, Mich.
Continental Die Casting Corp.,
Division of F. L. Jacobs Co., Detroit, Mich.
Crown City Die Casting Co., Pasadena, Calif.
Doehler-Jarvis Corp., Pottstown, Pa.
Doehler-Jarvis Corp., Toledo, Ohio
Dollin Corporation, Irvington, N. J.
Du-Wel Metal Products, Inc., Bangor, Mich.
Federal Die Casting Company, Chicago, Ill.
Globe Imperial Corporation, Rockford, Ill.
C. M. Grey Mfg. Co., East Orange, N. J.
Heick Die Casting Corp., Chicago, Ill.
Hilfinger Corporation, Toledo, Ohio
The Hoover Company, North Canton, Ohio
Kiowa Corporation, Marshalltown, Iowa
Paul Krone Die Casting Co., Chicago, Ill.
Madison-Kipp Corporation, Madison, Wis.
Milwaukee Die Casting Company, Milwaukee, Wis.
Monarch Aluminum Mfg. Co., Cleveland, Ohio
Mt. Vernon Die Casting Corp., Mt. Vernon, N. Y.
Paragon Die Casting Company, Chicago, Ill.
Parker White Metal Co., Erie, Pa.
Precision Castings Company, Inc., Fayetteville, N. Y.
Precision Castings Company, Inc., Cleveland, Ohio
Precision Castings Corp., Chicago, Ill.
Pressure Castings, Inc., Cleveland, Ohio
Racine Die Castings Co., Racine, Wis.
St. Louis Die Casting Corporation, St. Louis, Mo.
Schultz Die Casting Company, Toledo, Ohio
Sterling Die Casting Co., Inc., Brooklyn, N. Y.
Stewart Die Casting Division
of Stewart-Warner Corp., Bridgeport, Conn.
Stewart Die Casting Division
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Stroh Die Moulded Casting Co., Milwaukee, Wis.
The Superior Die Casting Company, Cleveland, Ohio
The Tool-Die Engineering Co., Cleveland, Ohio
Twin City Die Castings Company, Minneapolis, Minn.
Union Die Casting Co., Ltd., Los Angeles, Calif.
Universal Die Casting Company, Los Angeles, Calif.
Western Die Casting Co., Emeryville, Calif.

AMERICAN DIE CASTING INSTITUTE, INC.

366 MADISON AVENUE NEW YORK 17, N. Y.

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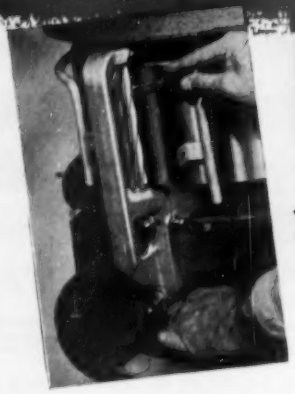
COLD FACTS

about YORK'S new ICE CUTTER



YORK FLAK-ICE AUTOMATIC ICE MAKER, MODEL DER-2

ICE HARVESTING SYSTEM

ATLANTIC'S ICE CUTTER CASTING

AN IMPORTANT COMPONENT of York Corporation's most recent development, the York-Flakice Automatic Ice Maker, is Atlantic's ice cutter casting. It cuts the ice into curved flakes... so delicate they will not damage or puncture delicate rose petals.

YORK'S ORIGINAL CONCEPTION of the ice cutter... a vital part of the ice harvesting system ...consisted of three stainless steel parts which had not only to be machined, but welded together.

ATLANTIC'S ENGINEERS suggested a design that eliminated these costly operations and increased the productive efficiency of the ice cutter. Six spiral blades on a center shaft were all plaster mold cast in one piece of Atlantalloy #31 High Tensile Manganese Bronze... an alloy of great endurance and strength.

York will testify that Atlantic's all-in-one-piece ice cutter casting surpassed all requirements for high physical values, closely-held tolerances, satin-smooth finish, fine-grained structure, clean-cut surfaces... and afforded them substantial savings over former costs.

Find out how the Atlantalloy plaster mold casting process can help solve some of your problems. Write for a free copy of "High Quality Precision Castings for Industry" today!

ATLANTIC CASTING and ENGINEERING CORP.
Established 1937
721 Bloomfield Avenue • Clifton, N. J. • PRescott 9-2450

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LETTERS TO THE EDITOR
continued from page 4

source of supply for Nickel-Silver Alloy?

We are manufacturers of clarinets and are using centrifugal casting (lost wax method), for our keys and need this metal badly. — J. R.

Please send information regarding die casters of lead parts. — R. E. F. (Chief Eng.)

We would appreciate any information, or source of information you can give us about die casting. We are interested in obtaining an overall picture of the field and its possible merit for supplying component parts for our products. — R. A. B. (Methods Engineer)

Please advise if you could let us have the addresses of firms doing powdered metal molding of porous materials that can be used for filtering purposes. — D. W. B.

Information sent. — Ed.

DIE CAST BERYLLIUM COPPER?

Please send the following information. Is it possible to die cast Beryllium Copper Alloy? If so, what are the best sources of procuring die casting of this material? — J. R. B. (Supervisor)

Beryllium copper is one of the most widely cast metals by the investment casting process, but we do not believe it has ever been cast by what is called "die casting". We did have an article telling about the "pressure" casting of beryllium copper over a steel hob to produce die casting die cavities, and a copy of this has been forwarded. However, the die casting of copper base alloys does not presently include beryllium copper.

Names of investment casters who are casting this material have been forwarded in the event that the parts under consideration are suitable for this process. — Ed.

Minimize the hazards of line breaks...

with Celanese*

LINDOL* HF

the flame-resistant hydraulic fluid

- chemically stable
- non-volatile
- odorless
- low pour point
- non-corrosive
- excellent lubricant

Lindol HF—industry tested for over 10 years in die-casting plants across the nation—provides an extra margin of safety for operators of hydraulically-activated machines. Plant managers depend on Lindol HF to minimize fire hazards in line breaks and other mechanical failure.

Lindol HF is unaffected by customary thermal and mechanical stresses of hydraulic equipment . . . remains stable at highest temperatures . . . contains no water, inorganic salts, chlorine or additives.

For greater safety with hydraulics, transfer power with Lindol HF. Write for new information bulletin.

Celanese Corporation of America, Chemical Division, Dept. 589A, 180 Madison Avenue, New York 16.

CELANESE LINDOL* HF

Appearance	Clear
Specific Gravity 20/20°C	1.160±.008
Boiling Range @ 10 m.m. Hg. °C	255—295
Volatility, 6 hrs. @ 100°C, % max.	0.1
Flash Point, °F Tag open cup	440—465
Fire Point, °F Cleveland open cup	685
Auto Ignition Temperature, °F	over 1100
Viscosity Range, Seconds Saybolt Universal @ 25°C.	240—325
Pour Point, °C	—25 to —30
Weight, lbs/gal. @ 20°C	9.7

LINDOL HF as an additive in regular petroleum lubricants (1½% by volume), and in synthetic lubricants (5% by volume), increases film strength and lubrication value.

Celanese* CHEMICALS

*Reg. U. S. Pat. Off.

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The meaning of a signature!

Through a quarter of a century of knowing how, the SUPER CAST reputation for Better Methods—Better Die Castings, has been recognized.

Sound engineering, metallurgical knowledge and skilled techniques have achieved and maintained a standard of superior quality.

SUPER CAST has kept faith, always deserving the mark it bears. SUPER CAST means die castings for those who want the best.

A sound, time-tested institution and a sound time-tested product have won confidence and widespread endorsment.

THE SUPERIOR DIE CASTING COMPANY

1001 London Road CLEVELAND 10, OHIO

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Between the Lines

in this and future issues of PMM

— WRITE OFF TOOL COSTS in the first 50 pieces? That's the story of a shell mold casting redesigned for simpler production now after more than half century as a sand catsing. Story on page 55.

— BOOKING is a word many of us might associate with a race track, but for designers it has special significance. It is a term used to describe a unique feature of the mercast type of investment casting. What it offers designers is described beginning on page 40.

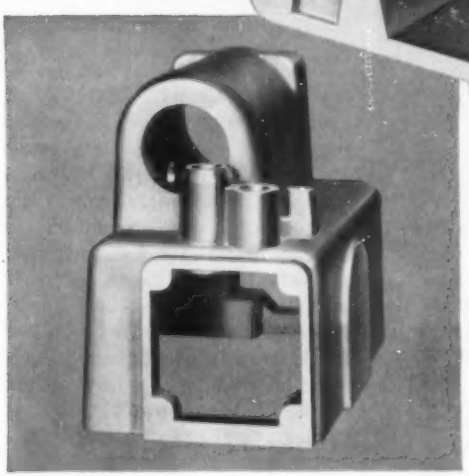
— THE MASS PRODUCTION industries . . . automotive, household appliance and business machine . . . were responsible for the rapid introduction of die cast components. These industries are die castings by the million because they find them less expensive . . .

— BUT SPECIALIZED INDUSTRIES, like those which manufacture medical, dental, opthalmic, surgical and similar equipment are finding that die castings pay off, even in small-scale production. Detailed study of this trend begins on page 31.

— IMPREGNATION of castings was, at one time, principally a salvage operation, Nowadays, many production lines are set up for 100 percent impregnation of castings that have to be pressure tight. Some companies buy their castings already impregnated

continued on page 10

DESIGNING
for multiple profits
with
MADISON-KIPP
ZINC AND ALUMINUM DIE CASTINGS



A Kipp die casting made for Detroit Lubricator Co., Detroit, Mich.

Just one glance at the instrument housing, here illustrated, will convince you that seasoned designing is involved—both primary and secondary—by the principal and by the die caster.

There are core pulls from five out of six sides. The tapers are ideal for aluminum. The wall sections are the lightest practicable for function. Minimum machining is required. In combination these features result in multiple returns—to the original equipment maker, the manufacturer of the product using the instrument and the ultimate user.

You can believe such established proofs and you can probably apply Madison-Kipp die castings to advantage in your new parts or those you expect to redesign. Please send your inquiries to our home office in Madison, Wisconsin.

madison kipp corporation

MADISON-KIPP CORPORATION
213 WAUBESA STREET • MADISON 10, WIS., U.S.A.

● Skilled in Die Casting Mechanics ● Experienced in Lubrication Engineering ● Originators of Really High Speed Air Tools

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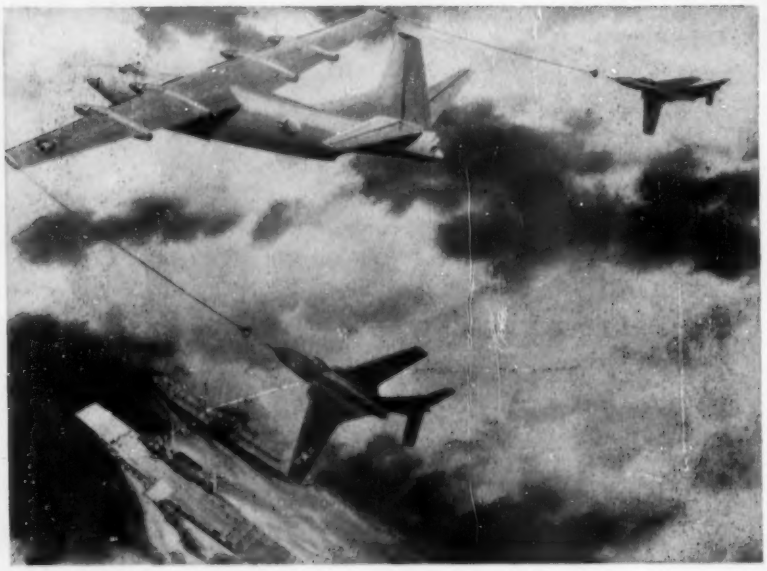
HITCHINER

Precision Investment Castings help make possible *FLIGHT REFUELING*



The first crude attempts at refueling airplanes in flight were made about thirty years ago. Today, the procedure is completely routine and reliable beyond question.

Flight Refueling Inc., Danbury, Conn., manufacture the probe and drogue system which has now reached a high degree of perfection.

Hitchiner precision investment castings are found in critical spots in the operation and contribute materially to making it successful. They may contribute equally to your products that require complicated small parts.

If you are interested in knowing how your small parts may be made economically to close tolerances, send us your drawings along with your problems.

Send for your copy of this new booklet that gives interesting data covering the design, application and manufacture of Precision Investment castings. IT'S FREE.

HITCHINER Manufacturing Company, Inc.
MILFORD 7, NEW HAMPSHIRE
Representatives in principal cities.

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BETWEEN THE LINES
continued from page 8

to save on inspection, eliminate possible rejects and generally improve characteristics of their components. Impregnating with metallic sealants is subject of an article that starts on page 59.

— FOR TWO MONTHS, the editors of PMM have been busy compiling special data sheets on metal powders. This is one of several special features to be added to PMM's Third Annual Powder Metallurgy Directory in April.

— THIS SPECIAL directory will be a reference piece you will want to keep permanently, listing all of your sources for specific types of powdered metal parts, as well as the manufacturers of equipment and metal powders.

— ON THE SUBJECT of metal powders, we have put together a report in this issue to show the designer of powdered metal parts why his source of metal powders is dependable. Although the manufacturer of machine parts and bearings accounts for a good part of the tonnage of metal powders consumed each year, there are many other users of these powders. Naturally, the greater the consumption of powders, the higher the production economy. Article that begins on page 44.

— PISTON RINGS by powder metallurgy? German manufacturers are reported to be using them successfully. PMM now has ready a full report on powdered iron piston rings for your evaluation. Look for it in February.

ANNOUNCING

industry's recognized buyers' guide of powder metallurgy

to be included in the APRIL, 1954 issue of PMM

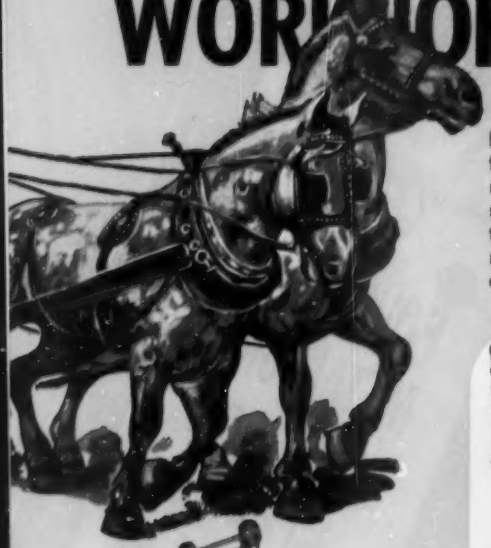
This year's Directory of Powder Metallurgy will be double the size of last year's edition. Planned and edited for maximum value to designers . . . buyers . . . fabricators, it will include complete listings of all sources and suppliers in the field.

Directory listings close February 1, 1954

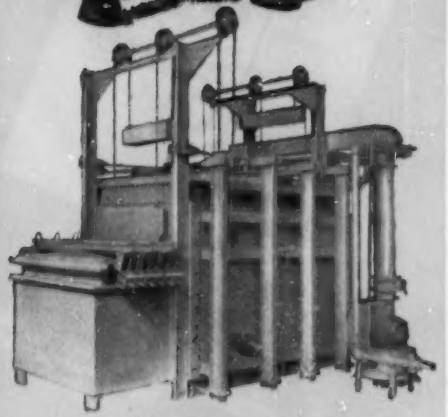
In three sections for easy use . . .

1. **INDEX** Alphabetical list of all suppliers and fabricators
2. **DIRECTORY** Expanded listing of suppliers and fabricators by type of product
3. **REFERENCE** New this year: data sheets on metal powders and metal powder parts

WORKHORSES for ALUMINUM

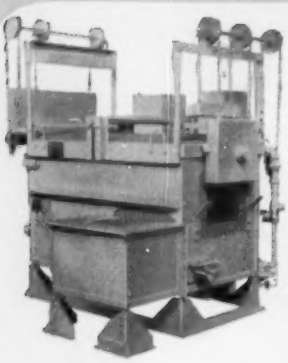


Here are the furnaces that bear the brunt of the burden in the aluminum foundry industry. They are designed for production of unsurpassed quality metal, in the fastest, most efficient and economical manner. Each has its specific purpose and capacity, meeting the exacting demands of sand foundries, die casters, permanent mold plants and smelters. They are recognized as the finest in the industry, reduce costs and make working conditions most agreeable. All furnaces may be fired by either gas or oil.



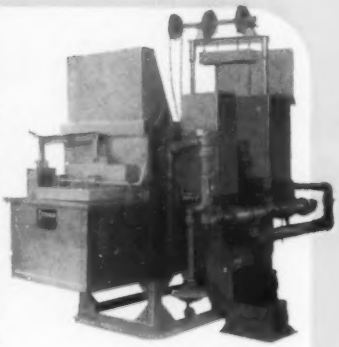
SMELTERS FURNACE

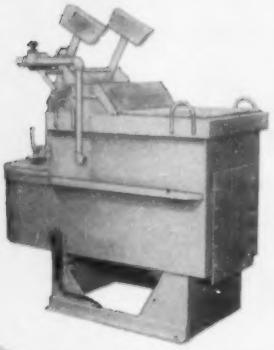
Built especially for smelters and other large melters. Easy charging, drossing, fluxing and alloying. Can be built to your own specifications. Capacities from 3000 lbs. Aluminum up.



MODEL "DC" FURNACE

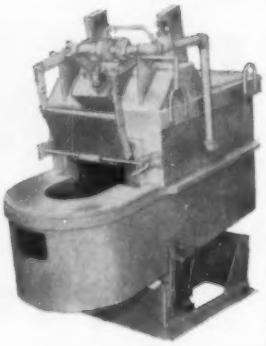
The 2 in 1 furnace. Breakdown and Holding in the same unit. Cold metal never reaches the molten bath. Assures metal of the finest quality on all classes of work. Close temperature control. Can be used as a sweat furnace for reclaiming inserts. Ideal for all types of plants including sand, permanent mold and die casting. Capacities from 350 lbs. Aluminum up.

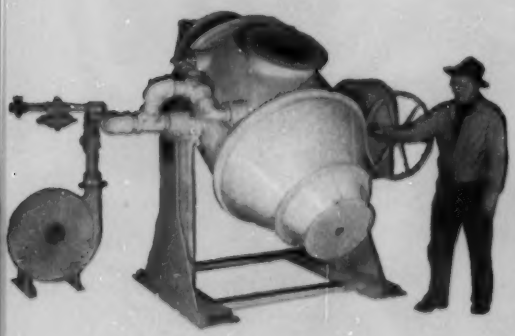




MODEL "DSC" DIE CASTING FURNACE

A small reverberatory furnace for melting and holding, or for holding only when hot charged at the die casting machine. Made in various sizes to meet your requirements.



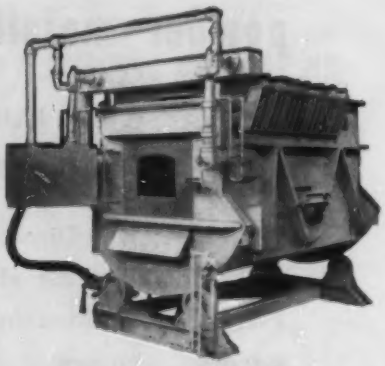


MODEL "BFC"

Hand tilt, open flame, barrel type furnace with flames firing tangent to inside of lining. Very fast melting. Used in all type plants including smelters. Capacities—500 lbs. Aluminum. A must for all aluminum jobbing sand foundries.

MODEL "MC" DIP-OUT TYPE

For melting and holding all in the same furnace. Hot metal always available. No iron pots or crucibles to replace. Capacities from 500 to 5000 pounds of aluminum.



MODEL "SW"—TILTING TYPE

Excellent to run back returns along with ingot required for permanent mold, die or sand casting operations. Also an ideal breakdown furnace. Capacities—600-1000-1700-3000 lbs. Aluminum.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

How precision casting cut costs 84%

on this small part

Inco precision cast this latch cam for retrievable gas lift valves. Previously, the part was machined from bar stock. Precision cast, it cut costs 84%.

Camco, Inc., of Houston, Texas, specializes in oil field equipment.

One of their products is a retrievable gas lift valve which can be installed in, or removed from, an oil well without pulling the tubing.

Inside the valve is a very important part, the latching cam, which locks the valve in place.

And that little part caused Camco expense and trouble — until they came to Inco.

The part had to be corrosion-resistant to resist oil well corrosives — it had to be strong to take the pressures — it had to be hard so that it wouldn't gall, seize or change shape despite years of exposure to corrosion, abrasion, shock and pull.

One metal they tried was hard enough but it proved too brittle. And costs to machine the part from bar stock seemed out of line.

Camco, already using Inco Nickel Alloys — Monel® and "K"® Monel — for other parts of the valve with good results, decided to consult Inco on this one.

After experimenting, Inco engineers recommended precision investment castings in "S"® Monel.

The price of the finished cam, including the cost of drilling and lapping, cut Camco's cost on this part 84 per cent!

Maybe this is the sort of thing that can happen to you.

Can You Cut Costs with Inco Precision Castings?

Whenever you have a part which is 6 inches x 5 inches or smaller, weighs under 3 lbs., requires starting tolerances as close as plus or minus .005 inch per linear inch, and needs 5 or more fabrication steps, there's a good chance you can save by having it precision cast.

What Alloys Can Be Precision Cast?

You may obtain precision castings from Inco in many metals and alloys, from plain carbon steel to the new super alloys. And no matter what metal you specify, you get many advantages.

Seven Advantages of Precision Casting

Precision castings may save as much as 60 per cent of production costs. (Savings like Camco's are unusually high.) They also make possible the use of extremely hard metals. Reduce machine shop bottlenecks. Lead to economies through re-design. Reduce metal scrap. Often permit the use of a higher alloy which otherwise would be too costly. Even make possible designs you previously thought impractical to produce.

To See How Others Have Cut Costs

Write for a free copy of "A Machinist's Nightmare Becomes a Designer's Dream."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO

Inco Castings PRECISION, SAND, CENTRIFUGAL

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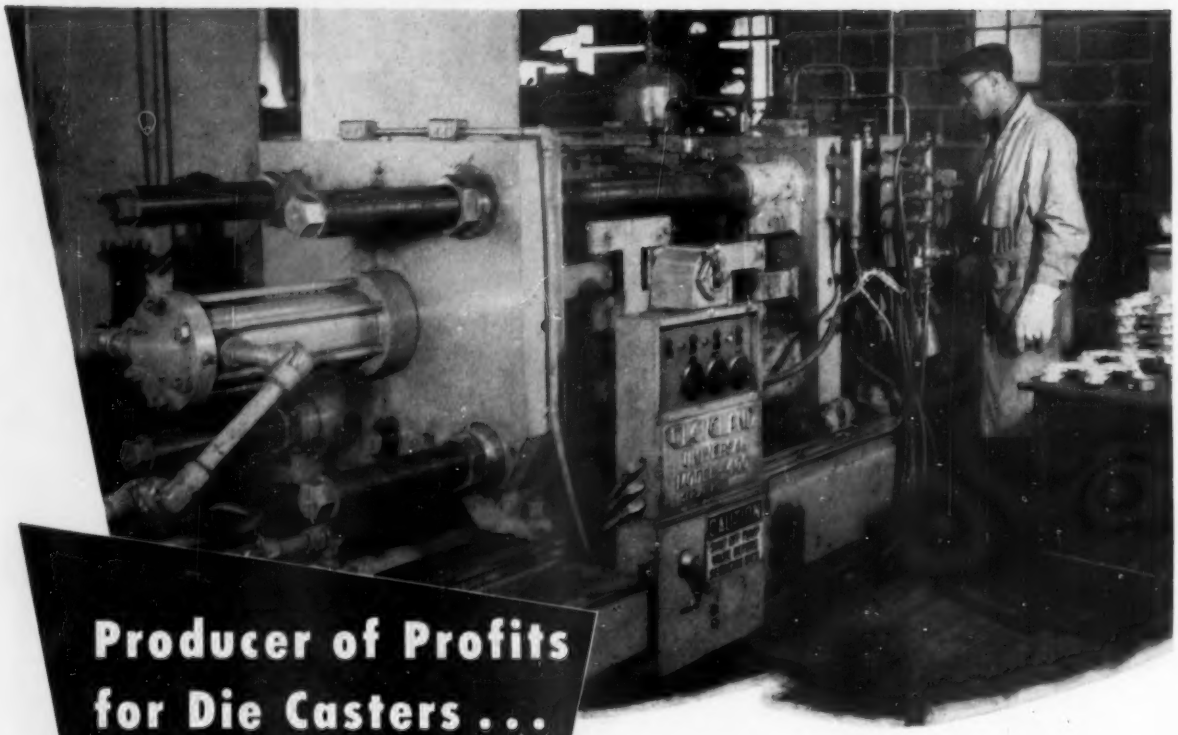

Producer of Profits for Die Casters . . .

Aluminum Burner Bases as cast in Clevelands

Photo at top of page shows one of two Cleveland Model 400 Die Casting Machines in operation at General Die Casting Company, Ferndale, Michigan. Among the many excellent parts produced by this prominent die caster is an aluminum burner base used by most leading gas range manufacturers. The burner bases are cast in a four-cavity die at the rate of 100 shots per hour. Weight of the shot is 2½ lbs. A gate of four castings and a finished part are shown above.

CLEVELAND model 400 die casting machines

Ask experienced die casters about Cleveland performance. They'll tell you these rugged, powerful machines can be depended upon to produce dense, *hardware finish* castings at a highly *profitable* rate of production.

Die casters like the ease with which Clevelands can be set up; the accessibility for changing dies, removing castings and machine maintenance. They like the simplicity and *safety* of operation; the fool-proof, automatic timing of the casting cycle. They like Cleveland's *universal* construction. Simply changing hot metal ends converts the machine from zinc to aluminum or magnesium casting . . . and any machinery handling crew can make the change *quickly*, without using special tools. That gives die casters all-around utilization of their machinery investment—and more profits for their shop.

Investigate Model 400 Clevelands for *your* die casting production . . . or Cleveland Models 200, 100 and 50, if your requirements call for machines of smaller capacities. Let a Cleveland engineer show you their advantages. For detailed machine information, write for bulletins.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

4952 Beech Street
Cincinnati 12, Ohio

SALES OFFICES: CHICAGO
CLEVELAND • DETROIT
HARTFORD • S. ORANGE

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

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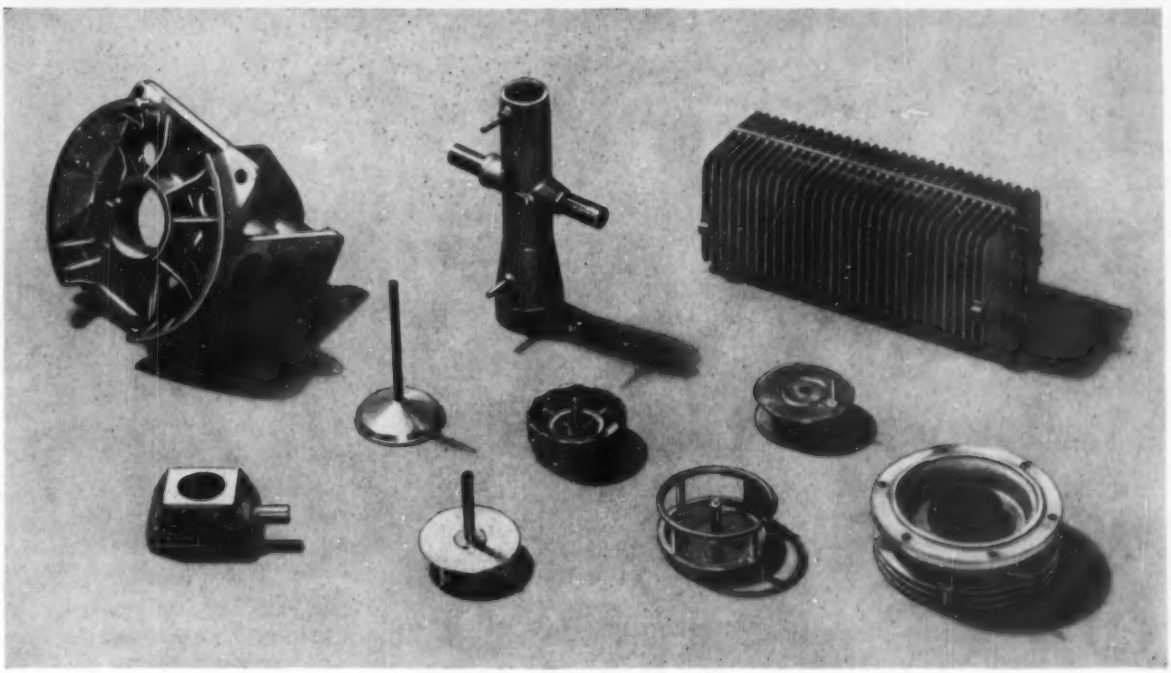
No Problem's Too Tough *when you call in* ... PRECISION



Cast-In Inserts

The use and application of die castings is greatly extended by Precision's ability to produce castings with inserts of any other metal. This makes possible the production of completely integrated parts — functional, electrical, structural, etc. Inserts can be cast in for functional and ornamental purposes.

Shown are some examples of Precision die castings with such inserts as studs, screws, sleeves, and electrical components.

A Precision engineer will be glad to discuss your problems.

Since 1909 the name "PRECISION" has been the symbol of highest quality in the die casting industry.

PRECISION CASTINGS CO., Inc.
212 Walnut St., Fayetteville, N. Y.
Syracuse, N. Y. · Cleveland, O. · Chicago, Ill.
Kalamazoo, Mich. · Cortland, N. Y.
British Affiliation — Wolverhampton Die Casting Co., Wolverhampton, England

For additional information Circle No. 22 on the Reader Service Card

REFERENCE MATERIAL

Catalogs and data offered free in this month's ads; to receive copies circle number on reader service card.

1. DIE CASTING LUBRICANTS for all types of service are described in reprint DC and bulletin No. 426-30A; both are available from Acheson Colloids Co.
5. THE CZ ALLOY PLAN is fully described in a folder that is available from the American Die Casting Institute, Inc.
7. A COMPLETE MACHINE CATALOG for die casters. The new Cast Master catalog lists die casting machines for every type and size of job as well as a complete line of machine accessories.
8. FOR GREATER SAFETY, higher power transfer and all around better working conditions Lindohl HF is said to do the job. A new information bulletin issued by the Celanese Corp. of America describes this material.
12. ZINC DIE CASTINGS whether small or large can be economically produced on the specialized equipment available at Dollin Corp. For more information ask for their Small Parts Bulletin and the General Facilities Bulletin.
13. PRODUCTION AND RESEARCH FACILITIES of the Hoover Co., Die Casting Div. are described in a booklet "DIE CASTINGS."
14. HOUGHTO-SAFE, the safe, nonflammable hydraulic fluid by E. F. Houghton & Co. is described in an engineering data book.
15. A MACHINIST'S NIGHTMARE Becomes a Designer's Dream, the story of what investment casting can do for the design engineer, a booklet by International Nickel Co.
16. DIE CASTING MACHINES made by the Kux Machine Co. are described and complete engineering details given in an illustrated folder.
18. BULLETIN No. 103 gives the details and specifications of the die casting machines built by Lewis Welding & Engineering.
23. WHO AND WHAT in die castings at Pressure Castings, Inc. is told and illustrated in their booklet "close-up of die castings."
24. FOR PARTS THAT CAN'T BE made, try Intricasting. An eight page booklet by Thompson Products, Inc., metallurgical products division tells about the process and what it can do.
27. "SUPERSHEEN SPEED FINISHING", a new booklet and catalog on finishing fixtures has been published by Almco Supersheen, Quen City Stove Works.
29. "HOW POLISHER PETE Put Economy in Polishing." A new booklet on abrasive belt polishing by Behr-Manning Corp.
32. PRECISION CASTINGS FOR INDUSTRY, the place of plaster mold castings in industrial production is told in a booklet from Atlantic Casting & Engineering Corp.
35. GREATLY INCREASED MECHANICAL properties in powdered metal compacts can be secured through the addition of MH chromium nickel pre-alloyed powders. Bulletin 800-A from Metal Hydrides, Inc. gives full technical data.
36. BASIC ENGINEERING DESIGN DATA is contained in the Newton-New Haven Co.'s book, "Dimensioning Die Castings."
39. METAL FINISHING DATA using the Iridite method and products is avaliable from Allied Research Products.
46. CASTABLE ALLOYS made by Henning Bros. & Smith., Inc. are described in the Henning Messenger.
49. DESIGNING FOR DIE CASTING is discussed in the literature available from Litemetal Dicast.
50. SPECIAL DIE STEELS for die catsing dies and machines are listed and their properties given in literature that has been prepared by A. Milne & Co.
52. THE FACILITIES AND SERVICES of Paramount Die Casting Co. are described and illustrated in literature now available.
54. SMALL PARTS FINISHING can be economically done by barrel finishing procedures. Literature is available from the Abbott Ball Co. describing their equipment, supplies and finishing methods.
55. TECHNICAL LITERATURE describing a new water white baking finish can be secured from Maas & Waldstein Co.
56. A 44 PAGE BOOKLET giving pointers on the best methods of metal cleaning has been published by Oakite Products, Inc. The latest issue is greatly expanded to discuss 16 new materials.
59. ALLOYS FOR INVESTMENT CASTING are described and their properties given in a brochure from the Cannon-Muskegon Co.
68. STAINLESS STEEL LADLES for handling all kinds of hot metal are described in Spincraft Corp.'s literature.
71. INCREASE DIE LIFE by cleaning your dies with Pangborn Corp.'s hydro-finish. What this equipment will do and how best to use it is described in their bulletin 1400A.
74. CASTING IMPREGNATION with a vacuum pressure-unit is described in the bulletin "Mogul Cast Seal Impregnating Process". A copy can be secured from the Metallizing Co. of America.
77. THE ENGINEERING DESIGN and consulting services available from Jersey Plastic & Die Casting Co. are fully described in a free booklet.
78. A NEW BROCHURE describing the services and facilities of the Racine Die Casting Co. is now available.

continued on page 94

for Quality Production

AMERICAN ELECTROLYTIC

99.99+% SLAB ZINC

A reliable source for die casting requirements

AMERICAN ZINC SALES COMPANY

Distributors for

American Zinc, Lead & Smelting Company

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For additional information Circle No. 4 on the Reader Service Card

the tone is clear because the design is simple . . . with

DIE-CASTING

CASE HISTORIES FROM MT. VERNON FILES

A greatly improved Hi-fi Speaker — at a reduced manufacturing and assembly cost—are the benefits University Loudspeakers, Inc., gain from the design of their new wide-angle reproducing trumpet, Cobreflex-2.

This effective design was made possible by die casting; one part replaces three spun sheet metal parts previously needed in their other horns. The trumpet assembly combines two identical aluminum die castings, to produce a pair of exponential horns having twin air columns in a single assembly. A "dual exponential flare design", University calls it—its advantages: a smooth, even radiation pattern of sound, free from the cancellations that come from cellular and multi-mouth horns. Tone arm and reflectors being integral, there are no separate parts to loosen and vibrate.

Yes, die casting keeps construction *simple* . . . and in almost any manufactured part, simplicity gives the best results. Die casting can be done to extremely close tolerances, frequently eliminating the need for machining. This too brings costs down.

Whatever *your* product, you can almost certainly profit by considering the advantages of die casting; light weight, simplicity, lower costs. You may find, as did University Loudspeakers, that an improved new design is made possible. Our varied experience of many years is wholly at your service. Let us know your needs today.

MT. VERNON
DIE CASTING CORP.
STAMFORD, CONNECTICUT

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USCO K

USCO K Aluminum Alloy is one of several standard die-casting alloys of the AXS-679 Revision 3 type. USCO K and other aluminum alloys in the K series are production controlled from raw materials to finished ingot under the most modern methods of alloying and refining — giving you the mechanical and physical properties you desire in your castings. If you prefer higher or lower Si, we can produce an aluminum die-casting alloy to your exact specifications.

With USCO K you'll have fewer rejects and increased volume — money in YOUR pocket!

Our metallurgical engineers, who have a practical working knowledge of your problems, are at your service always.

For outstanding castability — maximum production economy — uniformity of analysis and performance — order USCO K!

For 50 years, pioneers in aluminum development

USCO

U. S. REDUCTION CO.
East Chicago, Indiana

PLANTS: EAST CHICAGO, INDIANA • TOLEDO, OHIO

For additional information Circle No. 25 on the Reader Service Card

When Pressure replaced Gravity

DIE CASTING WAS BORN

Early Die Casting Machine in Operation

The production of castings by pouring molten metal into sand molds is an ancient art. The jewelry industry's requirements for smoother castings with sharper outlines, resulted in the development of a process utilizing plaster molds. In either case, however, the removal of the cast part necessitated the destruction of the mold. The search for a permanent mold for the quantity production of repetitive parts bore fruit in the Middle Ages when manufacturers of pewterware developed molds made of iron. In the 1800's so-called tin soldiers were also gravity-cast from hinged iron molds.

The next logical step was to improve the accuracy of cast parts by forcing molten metal under pressure into strong steel molds, instead of merely relying on gravity. This eventually led to the development of the linotype machine by Ottmar Mergenthaler. The basic principle of the linotype machine — pumping metal into a permanent mold by means of a plunger submerged in liquid metal — was adapted and embodied in the first die casting machine at the start of the century, and the first commercial die castings, such as automotive bearings, were produced from tin and lead-base alloys.

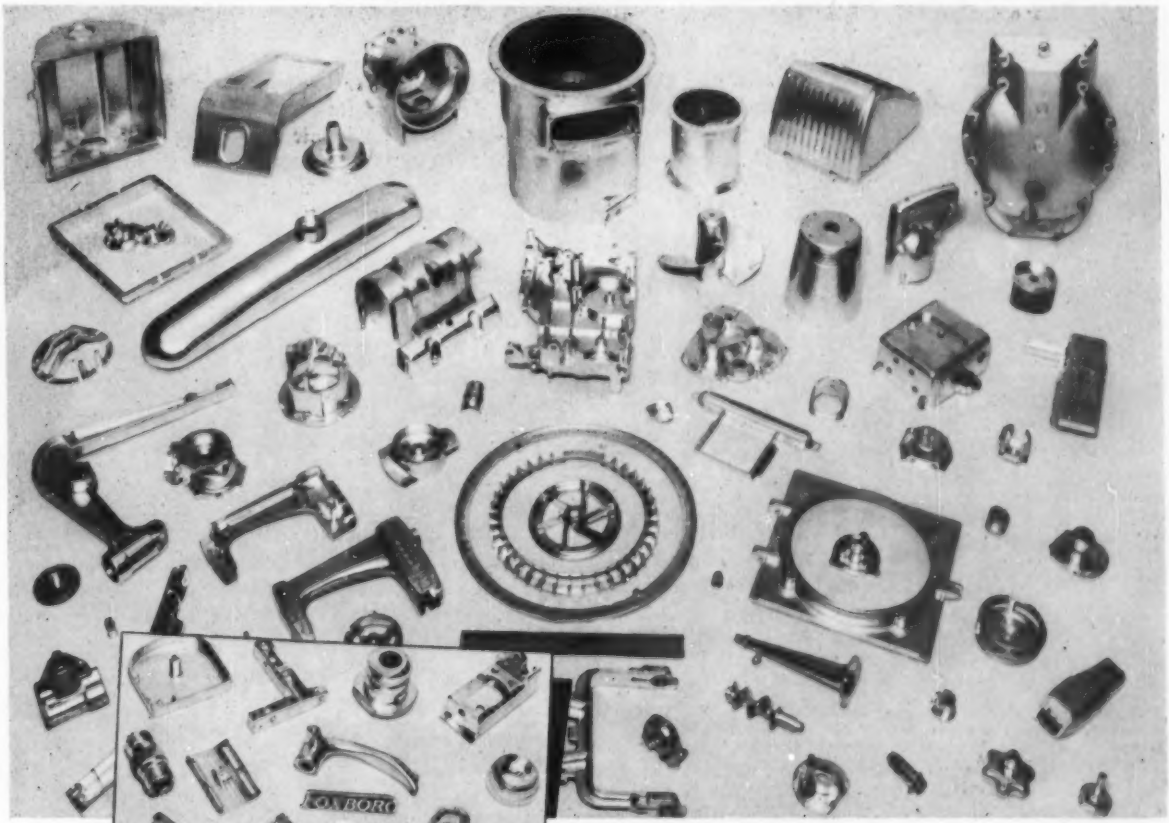
When early die casting experimenters — called upon for castings with better mechanical properties — turned to zinc as a base metal, little did they realize that zinc base die castings would finally advance to a point where they became a vital factor in modern engineering processing. Least of all would these pioneer die casters have foreseen that in a relatively short span of years their infant-industry would be outranked only by the galvanizing industry as the country's largest consumer of zinc.

EASTERN SALES AGENTS ST. JOSEPH LEAD COMPANY 250 PARK AVENUE, NEW YORK 17

BUNKER HILL 99.99+% ZINC

SALES OFFICE FOR PACIFIC COAST NORTHWEST LEAD COMPANY SEATTLE, WASHINGTON

CUT PARTS COST *with* DOLLIN Zinc & Aluminum DIE-CASTINGS



SMALL ZINC CASTINGS 1000 per lb. to 3 per lb.

Dollin-designed *automatic* equipment produces small zinc castings at *high speed*. Check with us on cutting piece costs . . . consolidating two or more parts into one . . . reducing machining operations. Send prints or samples for quotation . . . ask us for *Small Parts Bulletin and Samples.*

SALES OFFICES: Boston • Buffalo • Canton • Charlotte
Chicago • Detroit • Philadelphia • Pittsburgh • St. Louis • St. Paul

Specialized Equipment Cuts Costs Thru All Commercial Sizes

More and more leading manufacturers are finding out that they can cut costs with Dollin Die-Castings. Specialized equipment is the answer—developed, selected and adapted by Dollin through 23 years of specialized experience. It allows us to capitalize on *all* the cost-cutting advantages of the die-casting process. Send prints or samples for quotation—engineering advice at no obligation. *General Facilities Bulletin* on request.

DOLLIN CORPORATION
614 So. 21st St.
Irvington 11, New Jersey

For additional information Circle No. 12 on the Reader Service Card

NAMES & TRENDS IN THE NEWS

NEWLY ELECTED PRESIDENT of Precision Castings Co., Inc., is veteran die caster Bill During who has spent 31 years with Precision as chief engineer, vice president, general manager and, most recently, executive vice president. Retiring president Arthur G. Chase continues as board chairman.

DIE CASTING, Mr. During predicts, is on the threshold of unlimited expansion, not only because of its mass production speed, capacity to reduce weight, assembly and unit costs, but its ability to produce high load functional parts. Die cast parts which made possible economic production of the automatic transmission by the automobile industry has proved this conclusively.

• • •

DEPARTURE from the die casting industry has been announced by Charles Sanford, who has terminated 11 years association with Cleveland Hardware & Forging Co. to become manager of industrial relations for a Wisconsin paper company.

AS CHAIRMAN of the Safety Committee of the American Die Casting Institute for five years, Charlie Sanford has made an important contribution to the entire die casting industry. He and his two co-authors received the annual Doehler Award in 1951 for their "Safety Manual for the Die Casting Industry."

• • •

HIGH INVENTORIES of zinc are only a momentary problem, according to Andrew Fletcher, president of St. Joseph Lead Company. Returning from a 50,000-mile world travel as head of the American Institute of Mining and Metallurgical Engineers, Mr. Fletcher told a New York meeting that increasing population and an expected higher standard of living will create substantial demands for zinc and lead.

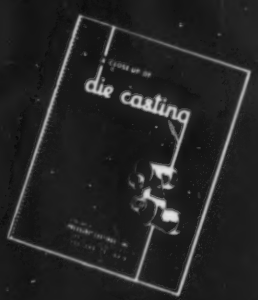
• • •

"IT'S UNSOUND to Europeanize the appearance of American cars by all-out copying of foreign styling, according to Carl W. Sundberg, Detroit industrial designer. "We are currently seeing an attempt to popularize European styling through advertising which overstresses its supposedly superior differences," he said.

"MISGUIDED ENTHUSIASM for European styling," Mr. Sundberg of the design firm, Sundberg-Ferar, Inc., told a meeting of the SAE in Detroit, "overlooks two basic facts. One is that most European cars don't meet American standards of comfort, maneuverability and safety . . . Another is that the American car, unlike its foreign brother, is essentially a multi-purpose vehicle. It's used as transportation for work, as taxi, school jitney, grocery truck, and for vacations."

PCI

If there are die castings in your present planning you'll find Pressure a complete and dependable source with which to do business...!



This booklet brings our organization to you, in words and pictures. Write for your copy today!

PRESSURE CASTINGS, INC.

die castings

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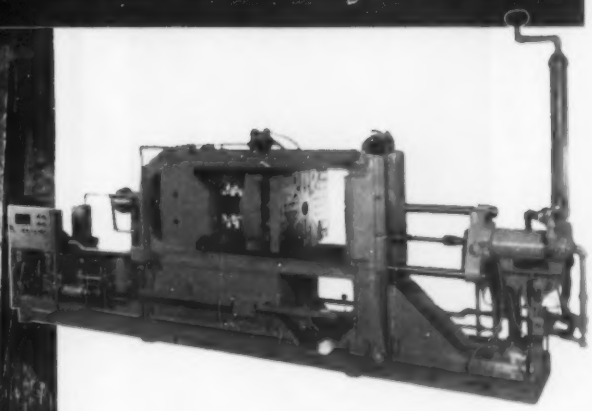
GIANT DIE CASTINGS

LESTER-

PIONEERED ON LESTERS



12 lb. 11-3/4 oz. aluminum housing for "Lawn-Boy" power mower, die cast by RPM Mfg. Co., in Lamar, Missouri on standard HP-3-1/2X-SF Lester-Phoenix die casting machine.

★ 12-3/4 POUNDS (WITH BISCUIT)
★ 390 SQUARE INCHES (20-1/2" x 23-1/2")
★ ACCURATE TOLERANCES
★ IN PRODUCTION—NOT A TEST PIECE
★ SUPER DENSE FOR SECONDARY MACHINING
★ WALL SECTIONS 3/32" TO 1/2"
★ EXCELLENT FINISH FOR PAINTING

GIANT LESTER MACHINES OPEN THE WAY FOR HUGE ALUMINUM DIE CASTINGS

This part is probably the biggest aluminum die casting ever mass-produced commercially. The confidence of RPM Manufacturing Co. in the ability of Lester machinery, is the background to the success of this project. As J. L. Rayniak, executive of RPM says, *"We are extremely pleased with the performance of the Lester-Phoenix die casting machine. It has more than met our expectations."*

And the patented Pre-Fill injection system with its speed, power and high final squeeze on the metal; the massive beam-type frame in conjunction with the toggle linkage in multiple shear—these features point the way to *even bigger* die castings!

Companies with similar applications in prospect can write to Lester-Phoenix, or the agents listed below, for more complete specifications.

PHOENIX DIE CASTING MACHINES

REPRESENTATIVES

New York	Steven F. Krould	Seattle .	Perine Machinery & Supply Co., Inc.
Detroit	Thoreson-McCosh	Cincinnati . . .	Index Machinery Corp.
Chicago	J. J. Schmidt	Los Angeles . . .	Seaboard Machinery Co.
Cleveland	Don Williams	San Francisco	J. Fraser Rae
Coral Gables .	Morton Machinery Sales	St. Louis, Milwaukee	A. B. Geers

FOREIGN

Toronto, Canada . .	Modern Tool Works, Ltd.
Sydney, Australia . . .	Scott & Holladay, Ltd.
Japan	Okura & Co., New York, Inc.

distributed by LESTER-PHOENIX, INC., 2708-R CHURCH AVENUE • CLEVELAND 13, OHIO

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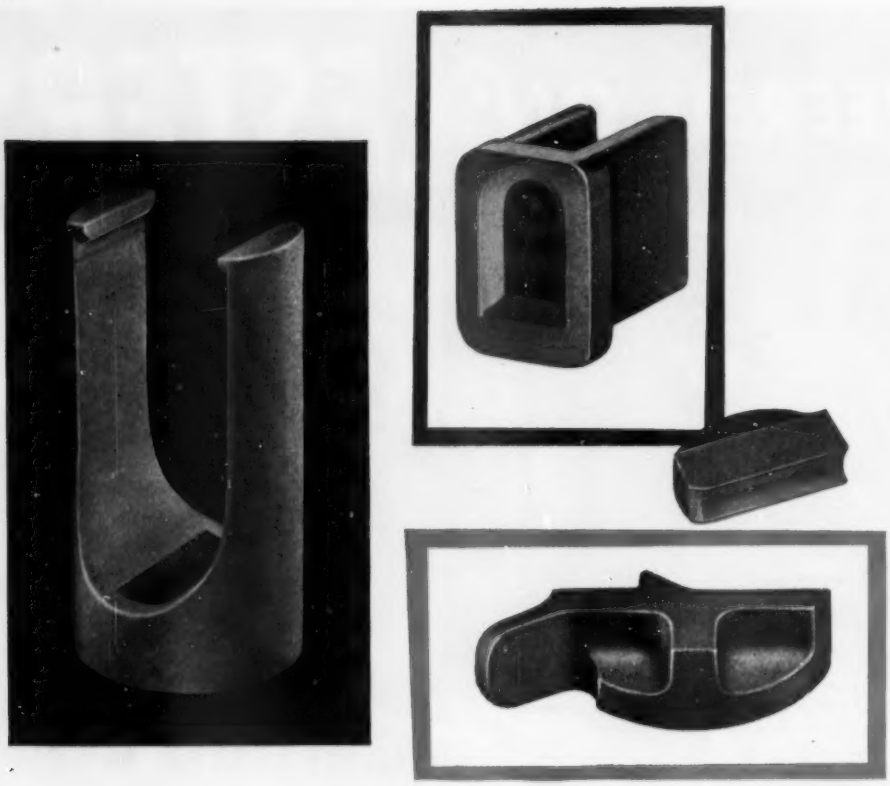

improve product design . . .

cut manufacturing costs

with ACCUMET PRECISION INVESTMENT CASTINGS

In many cases design is restricted and function limited when alloy steel parts are made on conventional machinery from bar stock or forgings. Frequently such designs can be improved and production costs lowered by the use of precision investment castings. That's because this casting process permits the use of high alloy steels that are difficult to machine or forge.

Take these four component parts of a pneumatic tool for example. They are Accumet Investment Castings made by Crucible of 8620 steel. They have a smooth, satiny finish and are held to very close tolerances. If these parts were not made by this "lost wax" process, the pneumatic tool could not be produced at a practical cost in its present design.

Crucible engineers and metallurgists are available to help solve design and production problems through the use of Accumet Precision Investment Castings. Write now, and let them help you solve yours.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking

ACCUMET PRECISION CASTINGS

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

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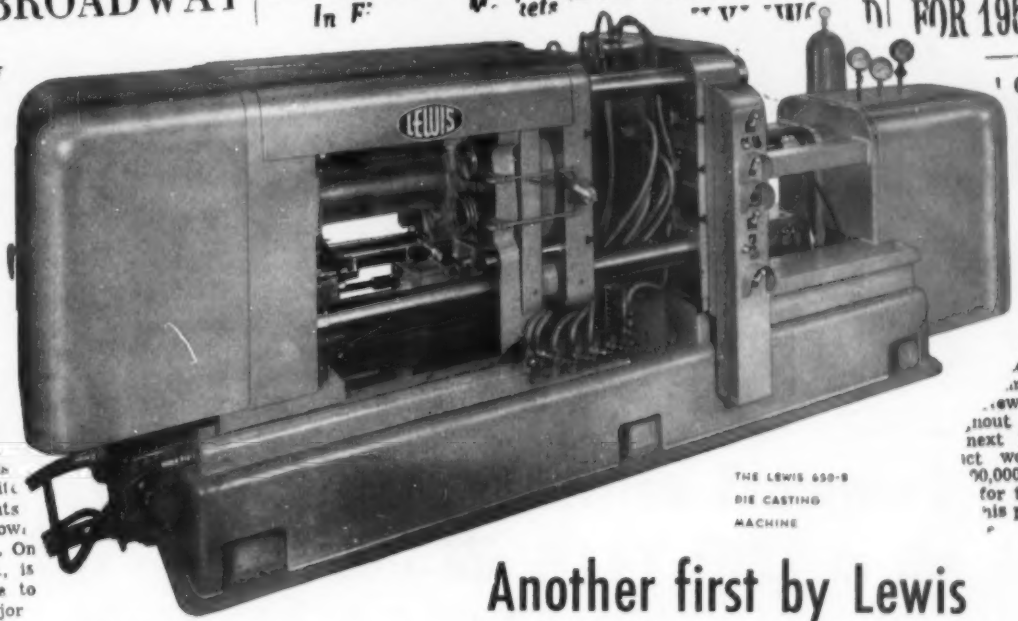
NEW DIE CASTING MACHINE REVOLUTIONIZES INDUSTRY

OR BROADWAY | *Summary of the Week In F[illegible]* | FOOD OUTPUT RISES | NO DROP FOR FOR 1954 BU



THE LEWIS 650-B DIE CASTING MACHINE

FEATURING

hydra lock BY LEWIS

Another first by Lewis

Cleveland, Ohio—New speed, safety, and economy have been brought to the die casting industry with the introduction of the revolutionary Lewis 650-B die-forge casting machine. Key to its fast production of top quality castings is the new "Hydra-Lock" clamping mechanism, used in conjunction with a high-speed two-stage 100,000-pound injection system.

Users of this new machine find it mass produces aluminum and magnesium alloy parts faster and with less scrap. The 650-ton "Hydra-Lock" clamp not only provides maximum safety for high-speed production but also permits faster die setting and compensates for moderate misalignment of die faces.

Designers of the new Lewis 650-B machine have included every known feature to make the production of die-castings quicker, safer and more economical.

1727-LW

Write for Bulletin 103 for details and specifications.

LEWIS

THE LEWIS WELDING AND ENGINEERING CORPORATION

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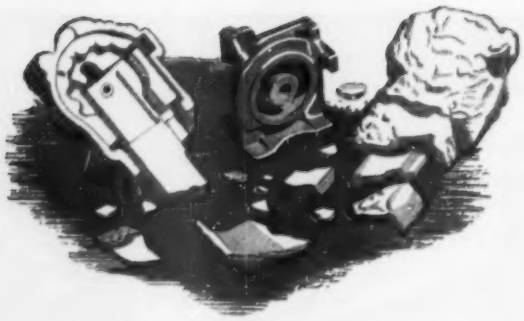


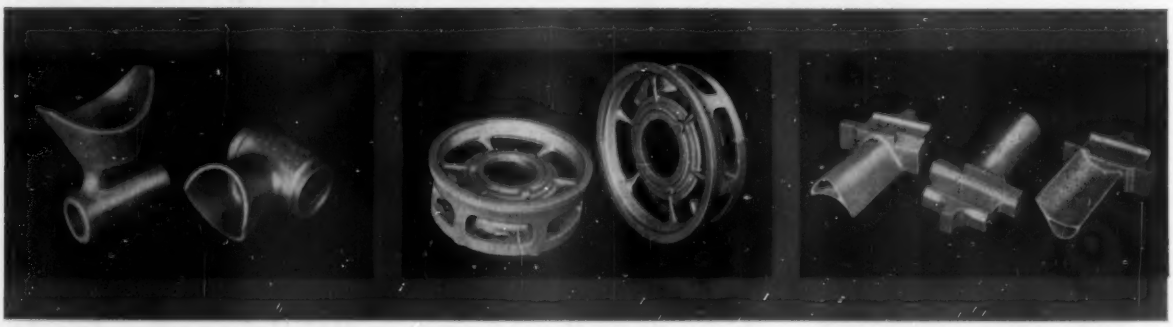
when a part can't be cast...

"INTRICAST" it

Ever figured out the formula and the curves for a part, then had to compromise with efficiency in order to come up with a design that *could* be produced in quantity at low cost?

That's the time to think of "Intricast" . . . an ingenious way to make patterns in frozen mercury that permit fast, high-finish castings of highest accuracy and intricate contour to be made on a production line.

The story of "Intricast" parts is too long and too dramatic to be told fully here . . . but write for our 8-page booklet MP-531 which gives all the details. A sales engineer can call at your convenience to help engineer "Intricast" parts into your products.



Metallurgical Products Division

Thompson Products, Inc.

DEPARTMENT MX-1 • CLEVELAND 17, OHIO

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Medical Equipment Sales: Up 44%

1952 ANNUAL SURVEY OF MANUFACTURERS

Value of Shipments, by Selected Classes of Products, for the United States: 1952, 1951, 1950 and 1947

(Value Figures in thousands of dollars)

Class of Products	Value of Products Shipped			
	1952	1951	1950	1947
Optical instruments and lenses	93,185	69,622	51,254	45,554
Surgical and medical instruments	58,897	57,914	44,042	41,327
Dental instruments, equipment and supplies	85,228	79,446	70,605	72,060
Opthalmic goods	145,180	130,795	110,843	105,338

Data — U. S. Dept. of Commerce

To designers it means

More Die Castings for Medics

MORE doctors are buying more equipment nowadays, according to the Bureau of Census.

Annual sales of medical, dental and optical goods have climbed more than a hundred million dollars since 1947. A large share of this represents the increasing sale of major equipment.

It has become essential for the medical practitioner to have advanced scientific equipment in order to utilize up-to-date techniques. One estimate places the average dentist's investment in equipment at about $5,000.

This growth in the sale of dental units, x-ray machines, opthalmascopes and the like has had an important influence upon the manufacturing methods used by medical equipment companies.

The building of scientific equipment is becoming more of a production-line operation, less of a manual finishing and assembling operation.

There are sound economic reasons why designers in these industries have begun using die cast components in increasing numbers. Where only a handful of small die castings were used five years ago, there are now literally hundreds of major die cast components: housings, frames, levers, functioning parts, bracket supports, etc.

Like other types of specialized equipment, medical and dental units are beginning now to enjoy the advantages of metal fabricating methods developed and perfected under the impetus of the mass production industries. On the following pages are indicated some of the trends. →

More Die Castings for Medics

Case No. 1

Dentists Buy Improved

SIXTY-five years ago Frank Ritter was considered a well-established and respected manufacturer of high quality parlor furniture though he had come as a cabinet maker to Rochester from his native land less than seventeen years before.

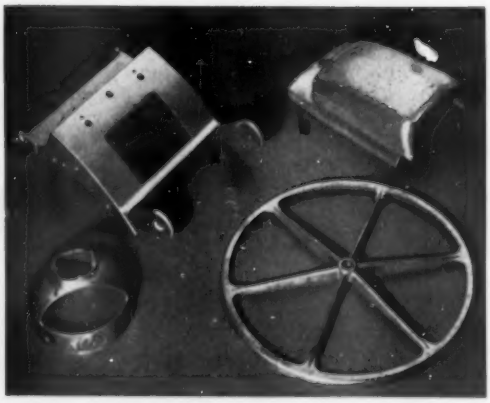
When an inventor from Michigan brought him the design of a new dental chair, Frank Ritter immediately saw its possibilities for

1. MODERN APPEARANCE of this Ritter dental unit has been worked out by industrial designer Walter Dorwin Teague.

2. DIFFICULT TO STAMP and draw to exact contour, many of these pieces are die cast with complex shapes.

3. RADII OF 100 inches have been die cast in support bracket, top, but would have been a problem otherwise.

4. WEIGHT TOLERANCE of ± ½ oz. in the die cast zinc cup holder permits use of automatic water shut-off feature.



Performance and Style

the dental profession which was badly handicapped at that time by crude equipment. The first Ritter Dental Chair was produced in 1887. At once it set a new standard in dental office equipment.

Over a period of more than 65 years, the growing company has earned itself a solid reputation among dental and medical practitioners. Besides its dental chairs, it has introduced many new types of products for the office and laboratory, among them the first electrical dental engine, electrical dental lathe and other special units.

In the course of its steady expansion, the company built its own sand foundry and has used these castings, along with metal stampings, for almost all structural components of their equipment.

Until a few years ago, the precision metal molding methods had found only token application in Ritter equipment. A few small die castings in zinc and some in lead for X-ray shielding were the only ones used.

With a change in company design thinking recently, a large number of aluminum and zinc die castings have been incorporated in Ritter's newest Instru-Matic dental unit, along with several investment castings and plaster mold castings.

Why is this manufacturer of specialized equipment finding uses for types of castings which have been largely developed and perfected by the mass production industries? There are four main factors:

1. **Sale of dental equipment has grown as more and more dentists have found that modern, up-to-date office equipment is a sound investment. According to the U. S. Department of Commerce figures, sale of dental instruments, equipment and supplies jumped from $72,060,000 in 1947 to $85,228,000 in 1952, which is a gain of more than 18 percent in six years.**
2. **Costs of hand labor for skilled machining and finishing have risen sharply so that the cost of more expensive initial tooling**

continued next page

Beryllium Copper Investment Castings For Strength Plus Surface

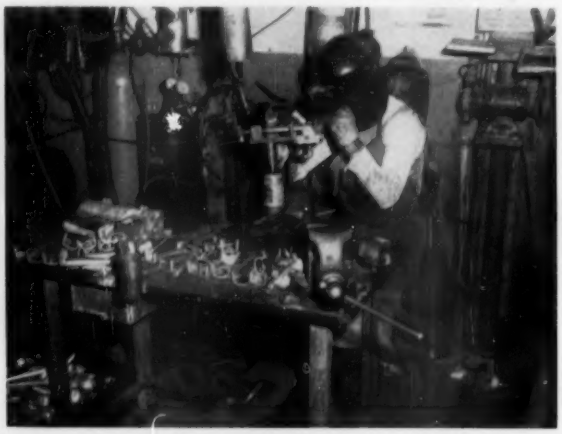
BY W. D. NOBES, Project Engineer, Product Engineering Division, Ritter Co., Inc.

SEVERAL investment castings have been introduced into the engine arm and an investment cast operating lever is likewise a part of this equipment.

These parts, some of which appear above, were originally specified in manganese bronze, but have more recently been changed to beryllium copper (Berylco 20C) because of better finish.

Strength is required in these pieces, especially the thumb lever. Likewise, good surface quality and rather close dimensional tolerance. Considerable machining is required by each of these pieces, particularly threading and boring of holes that must be held closer than commercial casting practice.

The several investment castings in the engine arm are produced for Ritter by Hitchiner Mfg. Co., Inc. The operating lever is cast by York Casting Co. and by Jelrus Precision Casting Corp.



INERT ARC WELDING has been selected to assemble these two sets of aluminum die castings. Joints are smoother, stronger and have less porosity than brazed or soldered joints.

Here's How Aluminum

Contours That Are Die Cast Include 100-Inch Radius . . .

can more often be justified by the saving in secondary costs.

3. **As the industrial designer has become a partner of the engineer, the elements of aesthetic appeal and user-psychology have dictated the design of contours and shapes not easy to produce by the older methods.**
4. **Functional refinements in product performance have been introduced, demanding components not readily drawn from a sheet or machined from a rough casting.**

Review of some of the castings which are being used in the new Ritter Instru-Matic, Figure 1, will point up some of the factors outlined above.

Ritter engineers have designed new features into this equipment, most important of which is the functional improvement which gives the unit its name, Instru-Matic. The dentist's instruments are held in a concealed panel which advances when the dentist touches a miniature switch, putting his instruments within easy reach.

Industrial designer Walter Dorwin Teague has styled the unit, giving it clean, modern lines. Component parts are well-integrated, overcoming the tendency of older types of

Die Castings Are Welded in Production

AN unusual secondary operation is the assembly of aluminum die castings by inert arc welding. The shape of the instrument holder support and the engine arm support, at left, are such that they cannot be die cast in a single piece, even though the styling of the unit requires that these components be produced without joints or seams.

Each of these components is die cast in two sections, and fastened together by welding. The welding of aluminum die castings is not easy due to the inherent sub-surface porosity caused by the natural shrinkage of the material and the oxide film which forms on the surface.

Brazing and soldering were considered as means of joining these pieces but were discarded primarily because they fail to penetrate the oxide coating sufficiently and the joints were not strong enough. Brazing, in particular, generated high heats which affected the entire casting rather than the weld area only.

Inert arc welding, illustrated, was chosen because joints are stronger, smoother and have little tendency toward porosity. The highly concentrated heat minimizes temperature rise in all but the joint area, and Argon gas for shielding helps to minimize oxide formation.

Edge preparation to insure adequate penetration was obtained by making a single Vee-joint (60° included angle) on the ⅛" thick support arm, and a single bevel on the 3/16" thick instrument holder casting. Joints are cleaned with wire brush.

Welding is done with a 3/32" thoriated tungsten electrode and ⅛" diameter 2S filler rod which is the most weldable aluminum alloy.

A 300-am AC welding machine is used, with a storage battery hooked in series with the welding lead to improve welding quality by stabilizing the arc and permitting the use of less heat.

The engine support arm assembly is welded using 95 amps and from 7 to 10 liters of argon gas for shielding. To secure a strong enough weld, a water-cooled bronze casting is incorporated in the welding fixture. This permits high enough heat to "boil out" impurities and gas inclusion and insures complete penetration. The backup prevents collapse of the casting.

The instrument holder support is welded strictly for appearance and hence does not need the strength. Also, nature of the design calls for mating boss and hole to pin the castings in proper position, so that there is no danger that the parts could separate or move.

For this reason, no backup is needed and a simpler, fast-acting toggle jig is used for holding. Welding is done with 120 amps and 7 to 10 liters of argon gas.

Because surface condition is critical, these welds are carefully inspected, ground and inspected again prior to painting.

dental units to look cluttered and inefficient.

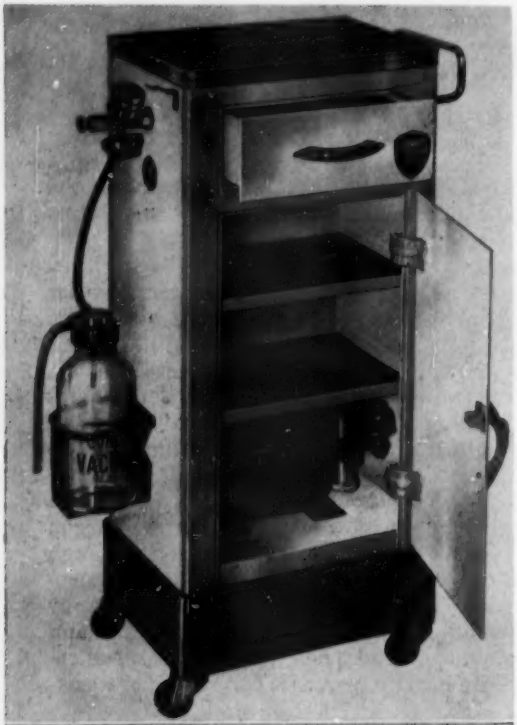
Because the design of dental equipment does not change every year, as is common in consumer goods manufacturing, tool costs are spread over a longer period, compensating for the smaller annual output.

As a matter of fact, the cost of building and maintaining die casting dies for many components is substantially less than for stamping dies to produce the same components. Some of the individual castings in Figures 2 and 3 reveal this, even on casual examination.

Two good examples of this are the castings in Figure 2 marked (a) and (b), the instrument head hinge and the cup dispenser door. The contours of these pieces could not be drawn satisfactorily from sheet in one piece, and the cost of individual stamping, forming and holding tools would be exorbitant.

As die castings, they come from the die in one piece, with contours exactly as specified. On this point, the industrial designer has found that die castings allow much greater design freedom than stampings. Contours have been very carefully developed by the designer and are essential to the harmonious relationship of parts to the whole.

All of the die castings described here are produced for Ritter by Mt. Vernon Die Casting Company using ASTM aluminum alloy SC7. continued on page 90



MORE THAN 15 YEARS AGO this company found that die castings in zinc helped them produce a unique safety device for surgical pumps. Now, they are tooling up for more die castings because costs favor them.

More Die Castings for Medics | Case No. 2

Cored Slots Plus Pins Cast as Inserts Give Bayonet Lock

A BAYONET LOCK formed without machining has been provided by a pair of zinc die castings which, together, house a patented safety feature of many Gomco surgical suction pumps, above left.

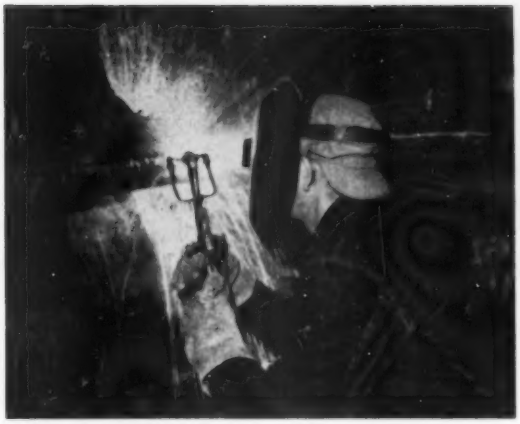
For more than 15 years, the two small die castings shown in Figure 2 have provided the simplest, surest and most economical method enclosing the safety overflow valve used on surgical and dental pumps built by Gomco Surgical Manufacturing Corp. of Buffalo.

By means of four slots cored around the perimeter of the female casting, and four smal', mating pins cast as inserts around the OD of the male casting, a positive assembly method has been achieved.

Despite their small size, these are not simple die castings to produce. Close match between the cored slots and the pin inserts is required in order to get the snug fit needed for closure. In addition, the cover casting has a narrow stem which is cored hollow.

Each casting is produced in a single cavity die, yet despite

continued on page 87



Scarfing and other uses of powdered metal . . .

assure buyers of powdered metal parts a . . .

Dependable, Low Cost Powdered Metal Supply

By Julius Sachse, Vice President
Metals Disintegrating Co., Inc.

ONE important specialized use of metal powders, namely, the powder metallurgy fabrication of parts, has been treated by PMM upon many occasions. The editors of PMM realize that the broader the base of usage of any raw material, the more reliable is its supply. As the base broadens, ever greater opportunities exist for reduction in cost of the raw material, brought about by increasing volume of production. To enable the readers of PMM to appraise this base, a review of the uses of metal powders other than the pressing and sintering of parts and bearings, is presented here.

LET'S examine some of the major uses for metal powders, other than bearings and mechanical parts.

The manufacture of coated welding rods consumes substantial amounts of various metal powders and their use in this industry is dictated mainly by economic considerations, although to a lesser and specialized degree, coated rods have peculiarly useful performance characteristics. As an example of the former type, a rod for the welding of 18-8 stainless can be made using a low carbon iron wire core coated with a mixture of appropriate fluxes and chromium powder and nickel powder.

The molten metal resulting from the use of this rod is of the proper chemical analysis. One of the savings that is inherent in this method of forming alloys is that inventory requirements can be maintained at minimum levels without sacrificing the flexibility which the welding rod manufacturer must have in order to serve his customers. It is apparent that practically any combination of iron, nickel and chromium can be made from stocks of only low carbon iron wire, nickel powder and chromium powder. If a wire were the intended analysis and the

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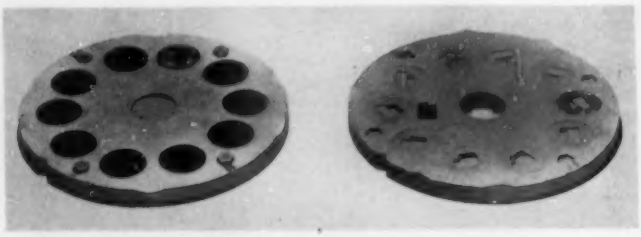


A PRODUCTION RECORD? This rubber mold makes 30,000 pieces at a cost of less than $50.00 for tooling.

You Can Use Lead

where precision dimensions and weight are needed

By J. B. LAZARUS, President,
Gasket, Packing & Specialty Co., Inc.

WHEN one thinks of lead, the normal connection is sheet products of a variety of sorts, pipe, washers and gaskets in various forms, wheel balancing weights, and sinkers for fishing. Where castings are concrened, the idea of any sort of dimensional precision or exact weight control without secondary operations is foreign.

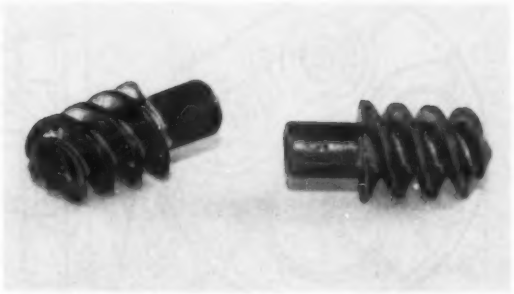
Yet, day after day, lead is being cast by both die casting and permanent mold casting methods to a high degree of accuracy, both as to weight and dimensions. The methods of doing this casting are, in some respects, standard and in others peculiar to the industry.

In the permanent mold casting of lead there is little difference in the casting of lead or any other metal. Since many of the parts are small, one pound or less, the molds are small and hand held, clamping is generally done with an ordinary C clamp and cores are inserted and pulled by hand. Molds are of low carbon steel and are usually not hardened. Mold life is exceptionally high and, in fact, it is seldom that a mold has to be replaced unless it is damaged by accident.

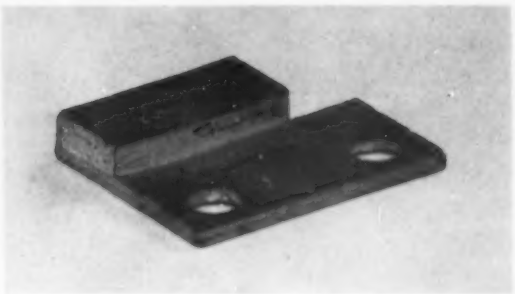
In view of these facts, mold costs are generally a little lower for a lead permanent mold casting than for other metals.

There is, however, another process of permanent mold casting used by the lead casting industry that is relatively unique. This is the use of rubber molds and centrifugal casting. A typical mold is shown above. As can be seen, the mold is made in two halves with a gate for pouring in one of them. Feed to the individual castings is cut into the mold rather than molded in. With this type of casting technique the tooling charges are exceedingly low. For the mold illustrated, pattern and mold costs were under $50.00. Such a mold, making ten pieces per shot, has a life of from 2,000 to 3,000 shots or, in terms of individual pieces, from 20,000 to 30,000 pieces for a total tool charge of under $50.00.

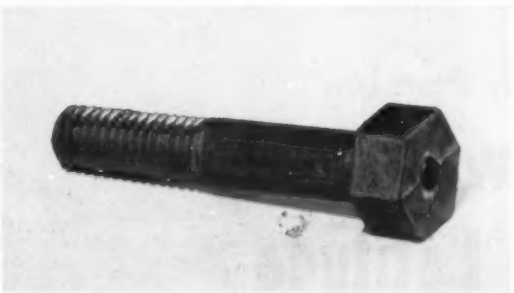
Tolerances and surface finish from a rubber mold are comparable to those from a metal mold except that extreme care must be exercised to make certain that the molds are allowed to cool sufficiently so as to prevent the burning of the rubber.



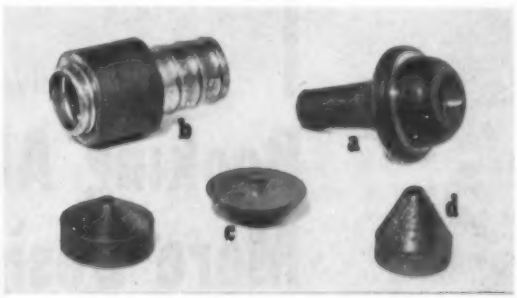
DOUBLE THREADED SPIRAL, centrifugally cast in a rubber mold. This part has two separate tapers in one direction so that a metal mold could not be easily made. The flexibility of the rubber mold permits the removal of the cast part without distortion.



BUSINESS MACHINE COUNTER WEIGHT, centrifugally cast in a rubber mold. The weight of 6 grams is held to a tolerance of ± ½ gram and all dimensions are held to ± 0.005. The two holes are punched after casting.



LEAD BOLT, permanent mold casting in a steel mold. The threads are cast. The mating nut for this bolt is also a permanent mold casting with the thread cast in. In the case of the nut, the threaded core rod is unscrewed in opening the mold. Generally the core rod is geared up so that a small part of a revolution of a crank will completely unscrew the core. After casting the thread is chased. Low carbon steel molds can be used unhardened and have exceptionally long life, seldom needing replacement due to wear or heat check. Shrinkage encountered with the lead alloys gives the die designer some problems so that it is not always possible to predict shrink allowances.



GREAT VARIETY in applications should be noted: (a) Drapery weight is die cast with a cored hole to hide the cord knot. (b) TV tube shield is die cast and the steel tube pressed in. Since different lengths are required, it is not economical to cast the tube as an insert. (c) Washing machine balance weight is die cast to a weight tolerance of ± 50 grains. Essentially no flash is allowable. (d) Battery seal to prevent leakage of liquid when the battery is tilted is a permanent mold casting. All dimensions are held to ± 0.005; the base must be within 0.002 of flatness when checked against a surface plate.

In the die casting of lead, standard hot chamber machines are used with the single difference that the dies are not hardened. A die lubricant must be used and one of the silicone types has been found to be the most suitable. Design of dies is different for lead than for other metals because of the rather great and unequal shrinkage that occurs.

It is not always possible to determine shrinkage accurately in advance. Hence, some modifications of the dies is sometimes necessary after they have been tried out. Here again, is an advantage of the soft dies since any necessary modifications are more easily and cheaply done than on hardened dies. It

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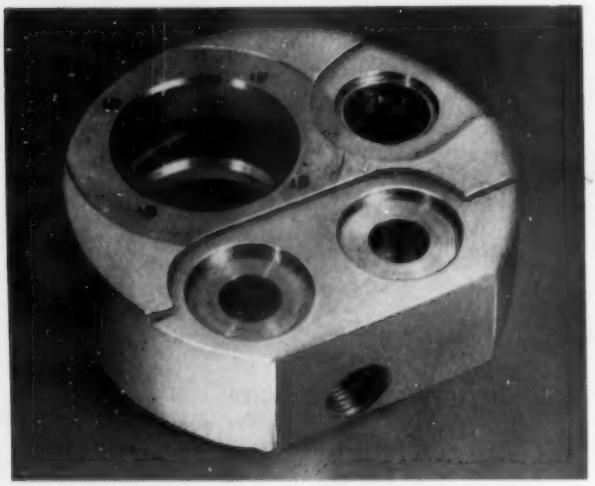
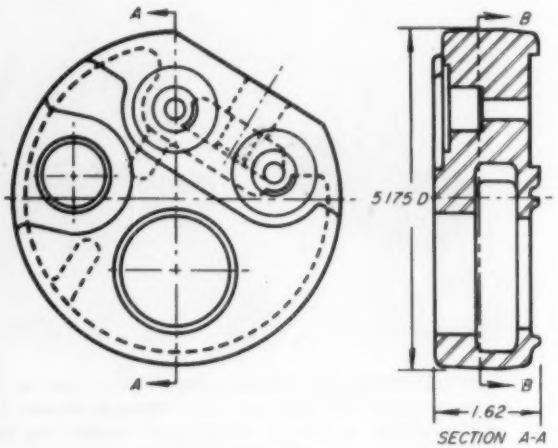




Mercast valve body shows how

Booking Allows More Design Latitude

HOW is it possible to produce castings with deeply undercut interior cavities that are smooth and accurate to ± .003 per inch by mercasting, an investment casting method using frozen mercury patterns?

The answer lies in the "booking" technique which is a unique feature of the process. Just what "booking" is, how it affects product design and a case history of a casting produced by "booking" are presented here.

The expendable pattern used in mercasting is produced by pouring liquid mercury into a steel mold and then freezing it. The frozen mercury is thus the counterpart of the molded wax or polystyrene used in conventional investment casting.

At this point in the process, however, one of the special properties of frozen mercury may be put into use: two pieces of frozen mercury adhere immediately upon being placed in contact. This permits patterns of a shape and size that could not normally be withdrawn from a steel die.

Editor's Note: Booking is one of several unique characteristics of investment casting from frozen mercury patterns. Others will be reported in future issues of PMM.

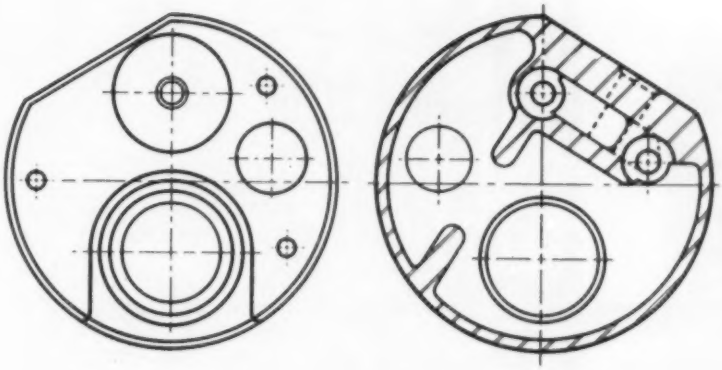
If two halves of a pattern are poured separately and the frozen halves then placed together, interior cavities having essentially the same accuracy and smoothness as the outside are possible . . . provided, of course, the halves are held in precise alignment.

To accomplish this, a method known as "booking" has been developed. Three photos, right, illustrate the process.

Outer surfaces of the pattern are formed by two die halves, while the interior surfaces are formed by a matchplate placed between the halves. One half of the interior detail is machined on each side of the matchplate. Die dimensions must be held to ± .0005.

When the two outer sections are assembled on guide pins and pilot holes, with the matchplate between them, the two halves of the pattern can be poured. The entire mold is then immersed in refrigerated acetone to freeze the mercury.

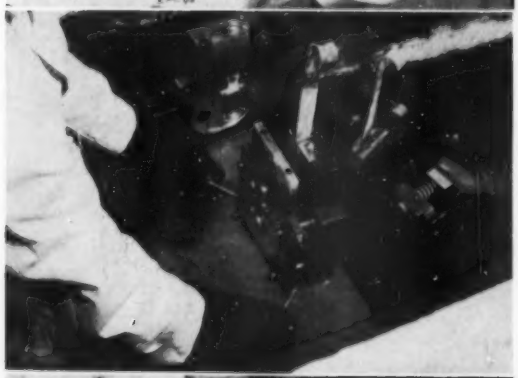
After being withdrawn from the acetone bath, the mold is separated, the center "leaf"



SECTION B-B

INVESTMENT CASTINGS

Originally designed and produced as a brazed assembly of three machined forgings, this valve body is now mercast in stainless steel in one piece. Leakage has been eliminated.



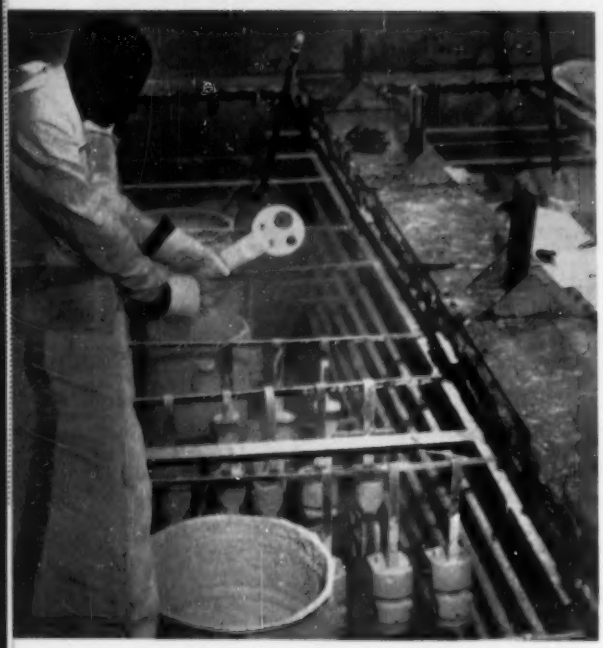
← The Booking Technique:

LIQUID MERCURY is poured into assembled steel mold. Two halves of pattern are cast at same time so that . . .

. . . WHEN MOLD IS OPENED, center matchplate can be withdrawn, exposing two sections of frozen mercury pattern, which are . . .

. . . ALIGNED BY DOWELS. Reassembling mold without "leaf" gives one-piece, "booked" pattern as frozen mercury halves join instantaneously.

Hollow Valve Body By Mercasting Is Pressure-Tight — Cont.



INVESTING IS DONE by dipping the frozen mercury pattern in a ceramic slurry. No flask is used for investing.

withdrawn, and the two outer halves placed together. The guide pins and pilot holes assure precise alignment of the halves so that, when the two halves of the frozen mercury come into contact, they weld immediately into a single, very accurate pattern.

From this stage, the pattern is invested with a ceramic mold material, the investment allowed to set, and the frozen mercury is melted and flushed out by directing a stream of molten mercury against it. The ceramic mold is subsequently heated to a high temperature to mature it, and it is then ready for casting metal.

For the product designer, the "booking" technique permits the use of shapes and internal conformations not otherwise feasible.

For example, an undercut section cored inside of a sand casting will have rough surface and inaccurate dimensions and will be difficult to hold in its relative position to other parts of the casting. If the undercut is located so that it cannot be reached with machine tools, the designer is faced with a choice of redesigning the piece as an assembly or of redesigning to avoid the undercut.

If he decides upon an assembly of two or more pieces, he then introduces the problems of cumulative tolerances, facing, fitting, gasketing and inventory control. To avoid these problems, a "booked" mercasting may permit a one-piece component that has the same accuracy and surface finish inside and outside.

How this works out in actual practice may be illustrated from the current production of Alloy Precision Castings Co. who have furnished the illustrations of the "booking" operation from their own contract mercast plant.

The piece being produced in the "booking" operation, page 41, is a valve body used in vacuum equipment. The finished casting, houses a three-position, solenoid-actuated valve that controls the pumping mechanism for evacuating TV tubes.

A drawing of the valve body reveals the hollow interior which must be held smooth and accurate. These surfaces could not be reached for machining, but must be used as cast.

The original design called for three brass forgings, brazed together and finish machined. Since the vacuum unit of which the housing is a part must be capable of developing pressure as low as one micron for processing TV tubes, all castings have to be tested for leakage. The brazed housings showed such a large percentage of rejects when tested that designers of the equipment looked about for a better way to manufacture it.

As redesigned, the valve body requires a minimum of finish machining such as facing and finish boring critical valve seats and drilling small mounting holes.

Furthermore, the designers were able to specify a more desirable material, and have made use of stainless steel alloy type 303. Leakage has been eliminated because there are no brazed joints, and costs have been sharply reduced because almost all machining has been eliminated.

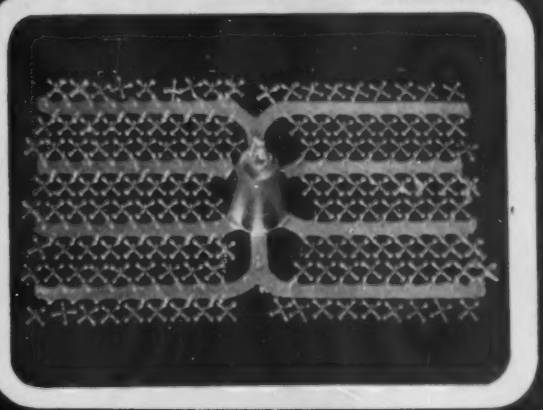
Critical dimensions are held to ± .003 and so, need only finishing cuts, if any. The casting weighs about 5½ pounds and is dense, sound and free of blowholes.

The mercast valve body has resulted in a more efficient, less expensive and easier to handle part.

Circle No. 1 on the Reader Service Card

telling the story of 'dag' dispersions

Want to Eliminate Sticking in the Die? Try This!



Try a 'dag' colloidal graphite dispersion as a die lubricant. Here's why it's good.

It's more slippery than almost anything . . . wholly unaffected by heat up to 750°F. You can spray it on, paint it on, or apply it by dipping.

Dies so treated take on a *dry lubricating film* that eliminates sticking, improves finish, and reduces carbon build-up in die impressions.

Lubricates ejector pins and plungers, too, so they don't stick or jam. Try a 'dag' dispersion now.

More details are yours by asking for Reprint DC and Bulletin No. 426-30A

* * *

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of vehicles.

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Acheson Colloids Company, Port Huron, Mich.

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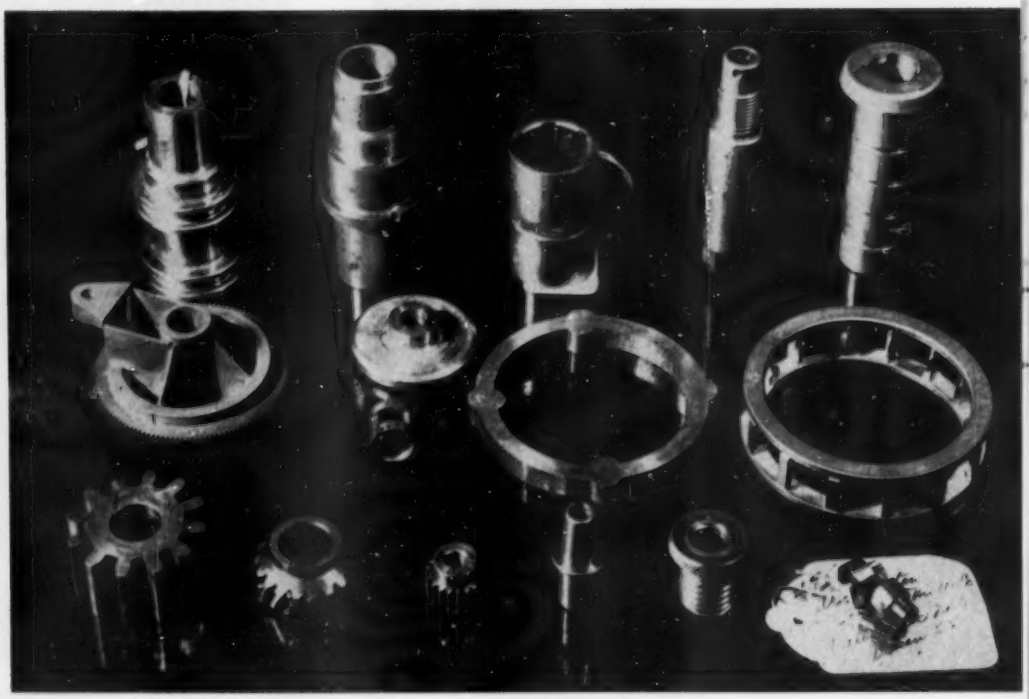
Typical Machined Bronze Continuous Castings



Copper-Base Continuous Castings:

- How are they produced?
- What are their advantages?
- Where are they used?

CONTINUOUS casting makes available a wide range of alloys in a form equivalent, in all essential respects, to long mill rods, tubes and shapes. Previously these same alloys have been available only as sand, permanent-mold or centrifugal castings. This new form of casting offers another tool for substantial economies in production.

The American Smelting and Refining Company's continuous casting process is reported to be the only one in commercial use producing copper-base alloy stock ready for machining or other fabricating operations. In commercial production since 1944 on alloys, over 50 million pounds have been produced. Actually, Asarco's continuous casting process has been in operation since 1937. It was then that production of phosphor deoxidized copper billets for brass mills began. These mills pierce and draw these billets to make copper water

TABLE 1
Typical Alloys

Nominal Chemical Composition						Typical Physical Properties			
TYPE I									
Asarcon No.	SAE No.	Cu	Sn	Pb	Zn	Tensile psi	Yield psi	Elong. % in 2"	Brinell Hard.
61	622	88	6	1.5	4.5	45,500	23,000	35	76
55	40	85	5	5	5	45,000	21,400	28	72
59	66	85	5	9	1	38,000	21,000	20	66
520		75	5	20		28,700	22,800	8	57
TYPE II									
110	65	89	11			51,000	29,000	18	100
102	63	88	10	2		49,000	25,000	18	86
100	62	88	10		2	51,000	28,000	18	92
80	620	88	8		4	49,000	23,000	18	77
77	660	83	7	7	3	44,000	27,000	16	72
773	Composition and properties same as 77								
1010	64	80	10	10		41,000	26,000	10	80
210		80	2.5	10	7.5	34,000	18,000	22	62

Typical Properties and Compositions

tubing. Over 400 million pounds of these billets have been produced to date. It is important to note, however, that all data in this article concerns only copper-base alloy products, continuous cast to customer specifications and in finished forms, except for machining and other fabricating operations.

Users report that it is in comparison with cast bronze bar stock available only in short lengths such as 13 inches, that they have found one of the main advantages of these continuous cast materials. Exactly the length required can be bought, up to 20 feet. Fewer pounds of metal must be bought, shipped and handled. There is no necessity to allow for metal rejects or excessive cut-off allowances. As a result, these continuous-cast bronzes may be machined on automatic screw machines, with high production at low cost.

These bronzes frequently replace sand and centrifugal castings due to greater uniformity, elimination of excessive machining as well as much greater freedom from impurities, blowholes, porosity and hard and soft spots.

Alloy constituents are far more evenly and finely dispersed. Since sand is not used and dirt and dross are excluded, there are no harmful surface or internal flaws or inclusions. Cutting rates are higher and tool life longer.

continued on page 48

CONTINUOUS CAST bronze bushing.

Singer's New Slant-Needle Model — First machine that's a cabinet *and* portable all in one. First with the needle slanted to make it easy to see and guide the fabric. Finished in soft beige or traditional black.

How Doehler-Jarvis Helped Singer Develop

...a new way to build precision

and make a fine product

Have you seen Singer's new "Slant Needle" Model... the sewing machine designed to make home sewing easier and more convenient?

In one minute it can throw up to 1,500 stitches into your lady's crinolines. It's the only combination portable and cabinet model on the market. (Conversion from one type to the other takes only seconds.) Yet the machine, including motor, weighs under 17 pounds.

Singer can tell you that it's quite a chore to build such features into a machine like this . . . and still keep it competitive. And they're frank to give Doehler-Jarvis major credit for making their job easier with a new method for designing and producing precision parts.

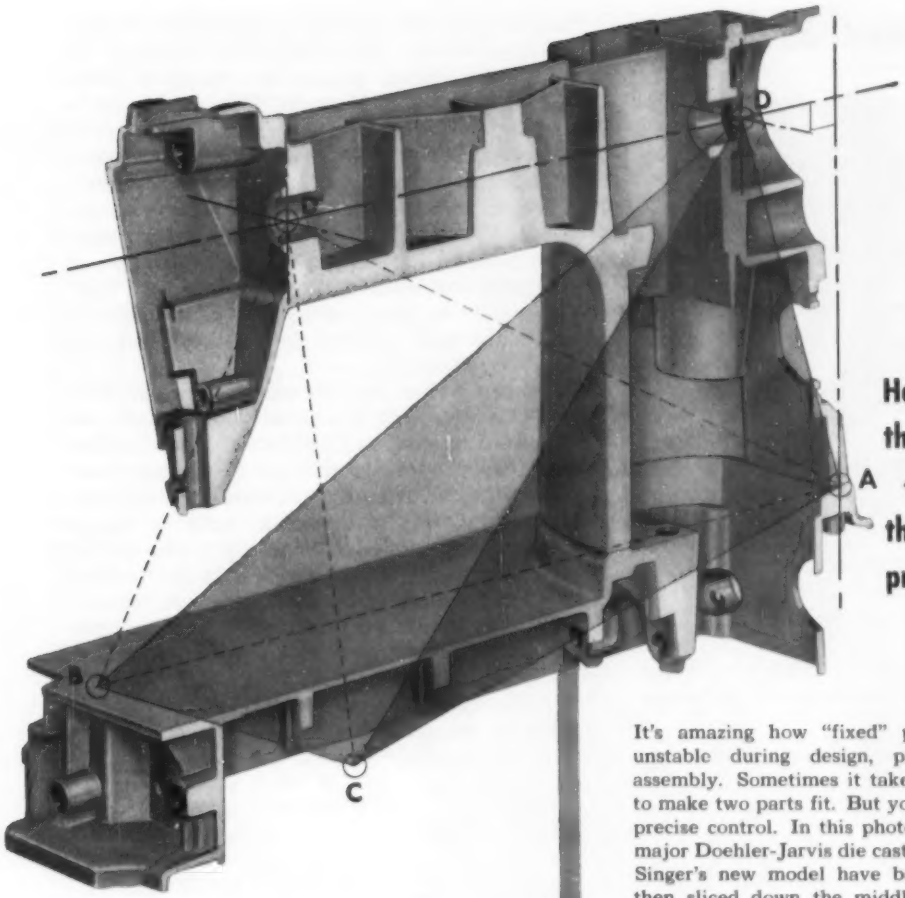
We call this precise new way of making things, "Tripod-Control Dimensioning."

It all started back in '35, when Singer asked Doehler-Jarvis to help pioneer the first die cast aluminum sewing machine components.

To meet the rigid precision requirements, Doehler-Jarvis engineers devised what may have been the first ground and hardened tool-steel casting die ever used. It had its faults, but it did give them machine-tool accuracy. And they discovered the germ of the "Tripod-Control" idea.

What had been discovered was the way to extend a familiar two-dimensional control . . . "baseline dimensioning" . . . to the control of precision in three dimensions. With it they could control precision of and *between* two (or more) die castings of an assembly. They selected a point of vantage common to the parts. Through the point was established a "tripod" of reference from which all critical angles and dimensions could be controlled. Errors vanished. Precision went up . . . assembly troubles down.

Then the idea spread in both the Doehler-Jarvis and the Singer plants. It was used to make multiple gauging jigs . . . used as the basis



Here are the "tripods" that control precision

It's amazing how "fixed" points become unstable during design, production and assembly. Sometimes it takes manhandling to make two parts fit. But you *can* establish precise control. In this photograph the two major Doehler-Jarvis die castings that frame Singer's new model have been assembled, then sliced down the middle to show the "Tripod-control" method. An imaginary plane of reference, ABC, controls the bed casting dimensions. It passes through point A, a real point of vantage common to both parts. With this plane as a base, imaginary "tripods" are erected to "fix" the plane ADD' and control arm-casting dimensions. The same planes control precision measurements in all following operations.

into parts

finer than ever

for ganged machining . . . used in finishing . . . used in assembly.

By the time the "Slant Needle" model came along, "Tripod-Control Dimensioning" had grown to a full-fledged design and production technique . . . based on die castings . . . used even in the first rough sketches of the new product . . . used in the planning stages . . . used throughout tooling and production.

Today? Well . . . you never saw production flow more smoothly when complex precision parts are made by one company, finished and assembled by another.

In its half century of die casting, Doehler-Jarvis has helped many producers, large and small, find the best way to take full advantage of die casting techniques . . . among them some of the best known makers of automotive, electrical, communication, household, office and other types of equipment.

When they come to Doehler-Jarvis, they know that Doehler-Jarvis can supply both the resources and the resourcefulness they need.

So next time you have a new product on the boards . . . call Doehler-Jarvis in on the design and production engineering. We may be able to give you just the solid kind of help you're looking for.

Doehler-Jarvis Division

of

National Lead Company

General Offices: Toledo 1, Ohio

* Reg. U.S. Pat. Off.

For additional information Circle No. 11 on the Reader Service Card

Higher Fatigue & Impact Strength Cont.

PISTOL GRIP shape is cast in bronze.

Fatigue strength is reported to be about 33 to 100 percent higher and impact strength is increased from 15 percent to more than double that of the similar compositions formed by other methods. Greater tensile and yield strength, as well as improved hardness, are also reported.

The production of these copper-base alloys begins with the melting of carefully weighed charges of the required alloy elements in electric furnaces. The molten metal is transferred to the casting crucible, where it is maintained at the proper temperature.

The casting crucible is totally enclosed within the furnace and is maintained under a nitrogen atmosphere. The process, which operates as a true gravity-fed bottom-flow casting method precludes the possibility of trapping incidental dirt and dross. Such foreign matter as may enter the system floats on top of the melt without turbulence to carry it into the product.

Freezing from the bottom upwards permits the escape of any dissolved gases which are liberated during solidification. The molten bath, functioning as a huge riser and head, prevents the formation of shrinkage cavities.

Solidification of the rod, tube or shape takes place in a self-lubricating, water-cooled graphite die which is installed in the bottom of the casting crucible. Driving wheels, mounted directly beneath, withdraw the solidified product continuously at a controlled speed.

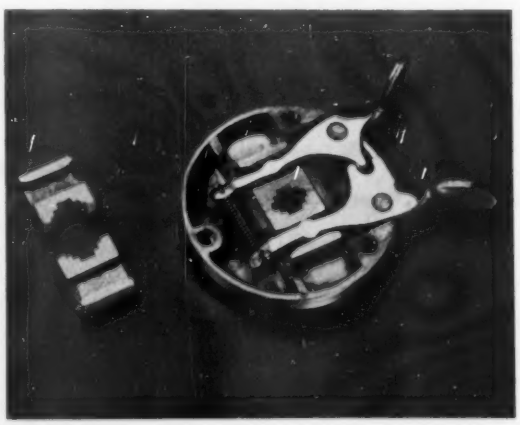
A traveling saw, mounted below the driving rolls, is engaged at proper intervals to cut uniform lengths.

Chuck Jaws – Half Price by Powder Metallurgy

ONE of the best ways to lower production costs is to reduce or eliminate entirely, milling machine operations. This has been done by Apsco Products, Inc. in the chuck jaws for their automatic pencil sharpeners by substituting a powdered iron part for the formerly machined piece.

As originally designed and made these chuck jaws, shown in the illustration, were machined by milling from SAE 1020 bar stock. The operations were to cut off, mill the slot, mill the jaws, surface finish and then nickel plate. The resulting jaws cost $20.14 per thousand to make.

As now made by Metal Powder Products Co., the jaws are made from iron powder and need no finish machining. They are cyanide hardened and then nickel plated using standard barrel plating processes. The cost of the finished parts made from iron powder is approximately one-half the former cost.



ADMIRAL ALAN KIRK NEW BOARD CHAIRMAN OF MERCAST, INC.

Admiral Alan G. Kirk (Ret.), former U. S. Ambassador to Russia, has been named chairman of the board and chief executive officer of Mercast, Inc., it has been announced by the company's directors.

The announcement was made following a luncheon for Admiral Kirk and the directors of the company, given by Floyd B. Odlum, president of Atlas Corp. Atlas Corp. and Thompson Products, Inc., are the two largest stockholders of Mercast, Inc., developers of the Mercast process which employs frozen mercury to make castings of highly complicated metal parts.

Admiral Kirk retired from the Navy in 1946 with rank of Admiral following a long and distinguished naval career beginning with his graduation from the U. S. Naval Academy in 1909. Serving with the Atlantic Fleet during World War I he rose through the ranks to become a Rear Admiral.

During World War II he served as Commander of the U. S. Naval Forces in Europe, headed the Amphibious Force of the U. S. Atlantic Fleet and commanded the U. S. Naval Task Forces in the invasions of Sicily in 1943 and Normandy in 1944.

After his retirement from the Navy he was appointed American Ambassador to Belgium and Minister to Luxembourg, later serving as U. S. Representative on the United Nations Special Commission on the Balkans. He was appointed American Ambassador to Russia in 1949 and retired from that post in 1952.

MILNE ANNOUNCES CHANGES

A. Milne & Co. nationwide distributors of solid & hollow tool steels have announced several personnel changes effective January 1.

Harvey C. Blesch, formerly connected with Milne's Chicago office is now manager of St. Louis office located at 4378 Lindell Blvd., St. Louis, Mo.

John I. Kitts, formerly manager of the Dayton office has been named manager of the Cleveland office located at 11110 Avon Avenue, Cleveland, Ohio. Mr. Kitts replaces H. D. Groth who is resigning from the Milne organization to establish his own business.

The Dayton office at 20 South Charter St., Dayton 2, Ohio will be managed by Carl F. Rand, formerly manager of the Worcester, Mass. office.

Frank R. Sanning, has been transferred from the Boston office, to assume the position of manager of the office located at 58 Front Street, Worcester, Mass.

KAISER APPOINTS LORCH

Vern Lorch has been appointed technical specialist in the Pig and Ingot Product Office of Kaiser Aluminum and Chemical Sales, Inc., Chicago.

"Cleveland" Die Castings of Zinc or Aluminum
Precision-made to reduce your finishing and assembly time
"Cleveland" will work with your engineers to develop matched designs for assembly with minimum or no machining. Prompt quotations and honest effort to meet delivery requirements.
Member of "The Certified Zinc Alloy Plan".
THE CLEVELAND HARDWARE AND FORGING COMPANY
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Our 72nd Year of Business
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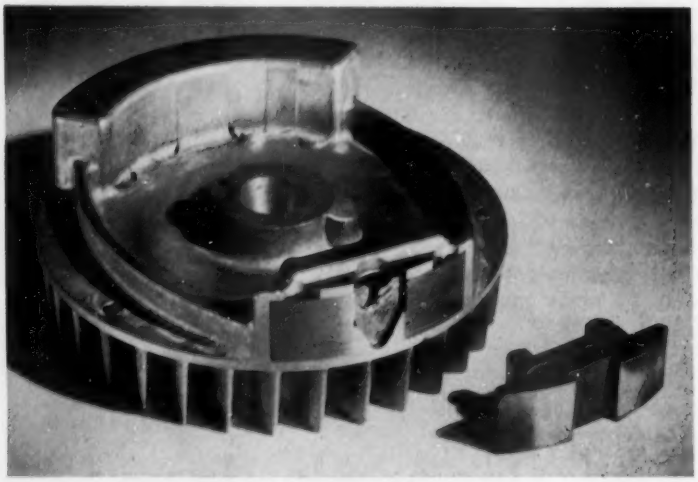

COMBINATION of an aluminum die casting and a sintered Alnico magnet have reduced weight and improved performance of this flywheel for a power lawnmower.

Low Inertia Flywheel Design

. . . using New Materials

BY J. R. HARKNESS, Electrical Engineer,
Briggs & Stratton Corp.

MOST rotary lawn mowers on which Briggs & Stratton gasoline engines are used do not have powered wheels. The user must, therefore, push the lawn mower up any hills encountered in mowing. As a consequence, the weight of the mower is of great importance and every effort must be made to reduce weight to a minimum.

Since the flywheel contributes a considerable share to the weight of an engine, a study was made toward reducing flywheel weight on engines using a crankshaft mounted lawn mower blade. It was found that the blade itself had sufficient inertia so that the inertia of the flywheel could be reduced considerably without adversely affecting operation.

In these small engines the flywheel performs two functions in addition to that of a flywheel proper. The cooling fan blades are attached to the face of the wheel and the rear surface carries the permanent magnet and pole-pieces which form the rotating elements of the magneto. Since the chrome-iron magnet previously used formed a considerable part of the weight of the flywheel, a new, high energy magnet material, Alnico 5, was substituted. The metal of the flywheel itself was changed from die cast zinc to die cast aluminum, and the blower fan sections were reduced as far as possible without introducing undue difficulty in the construction and operation of the dies.

In the older design it had been possible to spot weld formed poleshoes directly to the magnet. With the change to Alnico this was no longer possible, so the pole-pieces were designed to be held against the ends of the magnet

continued on page 52

A & A Die Cast & Plastic Molds Co.
Ace Diecasters
Adept Castings Inc.
Advance Die & Mold Co.
Advance Pressure Castings, Inc.
Barrington Tool & Engineering Co.
Callen Mfg. Co.
Century Die Casting Co.
Chicago Die Casting Co.
Chicago White Metal Products
Cincinnati Die Casting Co.
Conneaut Die Casting Co.
Diecast Corp.
Die Cast Products, Inc.
Du-Wel Metal Products, Inc.
The Electric Auto-Lite Corp.
Falconer Metal Specialties Co., Inc.
Foster Consolidated Products Corp.
Glenvale Products Corp.
Grand Die Casting, Inc.
Hampden Brass & Aluminum Co.
Heick Die Casting Corp.
Indiana Die Castings, Inc.
Industrial Tool & Die Casting Co.
Jersey Plastic & Die Casting Co.
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First names

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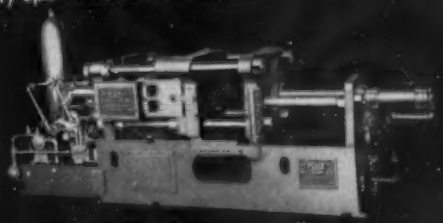
KUX

FIRST NAME IN DIE CASTING MACHINES

Here are many of the important Names among the companies that produce precision die castings to order. Whether during peace or war, these die casting jobbers are known for maintaining the highest standards of quality. Use of KUX Die Casting Equipment helps make this possible.

Continual study and improvement for over 30 years is responsible for the many exclusive engineering design superiorities that have made KUX machines the finest in their field. That's why you can be sure of maximum efficiency when you rely upon KUX Die Casting Machines.



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Paramount Die Casting Co.
Peat Manufacturing Co.
Petoskey Manufacturing Co.
Plastic & Die Cast Products
Plumer Die Casting Co.
Pioneer Diecasters, Inc.
Precision Castings Corp.
Production Die Cast Co.
Racine Die Casting Co.
Republic Die Casting Co.
Royal Die Casting Corp.
Rupert Die Casting Co.
Sterling Die Casting Co., Inc.
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Syracuse Die Casting Co.
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Trilex Corp.
Tri-State Die Casting Co.
Wells Die Casting Co.
West Irving Die and Tool Co.
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KUX

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SELECTED BY FIRST NAMES IN INDUSTRY

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Factories and Fighters

Thompson Precision-Engineers Light Metal Castings for All Industry

THE machinist turning out production parts and the pilot flying the speedy jet fighter have one thing in common—both can count on Thompson. The factory worker's machine and the pilot's jet engine are each improved by precision-engineered castings produced by Thompson's versatile Light Metals Division.

In the case of the fighter, it's any one of several parts including the alternator housing that's produced by Thompson—with the factory machine, one of the parts manufactured by Thompson is the casting for the fluid clutch.

These are but two of the many light, strong, durable castings designed, developed and manufactured by Thompson for a diversified list of customer uses. Today Thompson is producing light metal castings for such products as buses and garbage disposers; washing machines and jet planes; automobiles and industrial engines; ice scoops and aircraft engines.

Behind this ability to aid all forms of industry are over 50 years experience in research and manufacture of precision metal parts. Regardless of your product, if you use castings, Thompson's creative engineers will gladly show you where and how you can simplify your operations and save on costs with Thompson Light Metals Castings.

For a detailed description of the Thompson Light Metals facilities which are available to you, send for your free copy of "Creative Castings." Just write to Dept. P - 6, Light Metals Division, Thompson Products, Inc., 2269 Ashland Road, Cleveland 3, Ohio.

You can count on

Thompson Products

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For additional information Circle No. 38 on the Reader Service Card

FLYWHEEL MATERIALS
continued from page 50

during the die casting process, after which they were retained by the surrounding metal. A method was worked out whereby the two polepieces and magnet were pre-assembled and held together by a spring for insertion into the die.

The required shape of the polepieces indicated a riveted assembly of lamination. It was found, however, that solid polepieces of sintered iron could be used with very little decrease in performance and at a considerable saving in cost. The dimensional uniformity of the sintered polepieces is much better than could be obtained in laminated assemblies, contributing to uniformity and to better balance. The magnet and polepiece assembly is counter-balanced by a relatively heavy aluminum section.

The flywheel castings are produced in a two cavity mold. Final finishing consists of turning the outside diameter, reaming the tapered bore and broaching the keyway. Through the redesign the weight of the completed assembly was reduced 3½ lbs. as compared with the older flywheel and meets the same magneto and blower requirements. This decrease in weight also contributes a considerable cost saving.

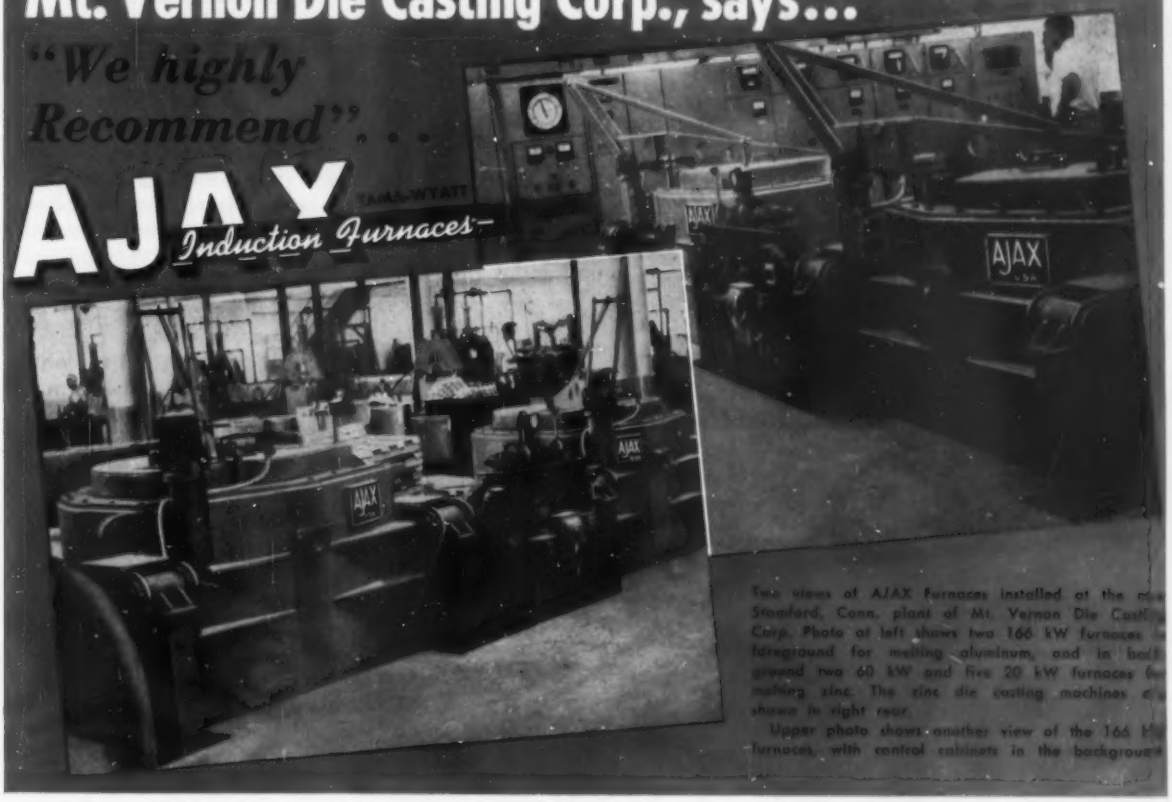
NEW ASARCO DISTRIBUTOR

The Clifford Metal Sales Company, Providence, R. I., has been appointed distributor in the State of Rhode Island for continuous-cast bronze products of the American Smelting and Refining Company, Perth Amboy plant, Barber, N. J.

Mt. Vernon Die Casting Corp., says...

"We highly Recommend"...

AJAX TAMA-WYATT *Induction Furnaces*



Two views of AJAX Furnaces installed at the new Stamford, Conn. plant of Mt. Vernon Die Casting Corp. Photo at left shows two 166 kW furnaces in foreground for melting aluminum, and in background two 60 kW and five 20 kW furnaces for melting zinc. The zinc die casting machines are shown in right rear.

Upper photo shows another view of the 166 kW furnaces, with control cabinets in the background.

After a most satisfactory experience of more than five years with AJAX *low frequency* Induction Furnaces in their Mt. Vernon, New York plant, this company has now installed the furnaces shown above in their new modern plant at Stamford, Conn. "We are convinced," they state, "that economy of operation makes this type of furnace well worth while. We intend to continue to install them till all our die casting machines are fed by AJAX furnaces."

AJAX induction melting and holding furnaces are finding wide acceptance in the American die casting industry. Experience has shown that they greatly improve the overall performance. In particular, the absence of fumes and reduction of radiant heat give greater comfort to the operators. Electricity is one of the few commodities which have not increased in price in recent years.

Agitation, due to internal electrical stirring, insures uniform temperature and homogeneous mixing of the ingredients. Since linings are made of inert refractories, they cannot contaminate the melt. Temperature control is entirely automatic and keeps the molten mass within ± 5° F., holding the metal at the lowest feasible casting temperature.

Amazingly low maintenance is the rule. Some furnaces operate for as long as 7 years without renewal of refractory lining. Rejects and metal losses are extremely low.

AJAX TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

For additional information Circle No. 2 on the Reader Service Card

Basic Material Exposition Set for Chicago May 17-20

The second Basic Materials Exposition, the product development show which had its premiere in New York last June, will be held at the International Amphitheatre, Chicago, May 17-20, it has been announced by Clapp & Poliak, Inc., New York, founders and producers.

Attendance among top management executives, project engineers, product designers, materials engineers, production experts, research men and sales and marketing executives at the first show exceeded advance estimates by a large measure. As a result, the second exposition will be considerably larger and broader in scope.

Exhibition space will be more than doubled and the number of participating companies will be increased by 50 percent. Seventy companies contracted for display space prior to the announcement of the second show.

Exhibits are limited to companies producing the basic materials which go into the making of other products. Manufacturers of end products and equipment producers may attend only as visitors.

A group of more than 20 heads of important companies will serve as a sponsoring board. These executives are providing guidance and cooperation for an exchange of industrial information and opinion to develop the best uses of new and conventional materials. Don G. Mitchell, chairman of the board of Sylvania Electric Products, Inc., again will head this group.

There are more than 25,000 different materials currently in use from which a manufacturer must choose in designing a single product, and each month new materials are being added to the number of possibilities. Many industrialists now believe that it is no longer possible for any single company to maintain an engineering department large enough to keep abreast of all developments.

You Can Buy . . .

COMPLETELY FINISHED DIE CASTINGS . . .

Maybe you didn't know it, but you can stop looking around for a shop to finish your die castings. We make zinc and aluminum die castings and have all the facilities for painting or plating them. So, let Kuhlman Diecasting Company furnish you with all of your die castings, machined, painted or plated, and ready to assemble in your product.

It will pay you to check on your facilities.
Let us quote on your die casting reqirements.

ZINC OR ALUMINUM ALLOYS
KUHLMAN DIE CASTING CO.
Address Inquiries to 7300 E. 17th Street • Kansas City, Mo.

For additional information Circle No. 48 on the Reader Service Card

ACP BRANCH MOVES

American Chemical Paint Company's Detroit Office has moved to 10225 West McNichols Road, Detroit 21, Michigan. D. L. Miles, manager of the mid-west territory is supported by a staff of technical sales-service representatives consisting of J. B. Rohrer, J. J. Linden, O. E. Crisler and other field representatives.

This company's first experience in using precision metal moldings has been so successful more are being studied.

Reduced Machining Allows

Tool Write-Off In 50 Castings

OVER the past fifty years, the valveplate facers that are used as porting plates in Waterbury hydraulic pumps or motors have been produced in substantially the same form. They have been sand cast and machined.

Now the company's first experience in using a casting that will simplify or eliminate much of the machining appears to be so successful that several other parts manufactured by Waterbury Tool Division of Vickers, Inc., are being considered for conversion.

The valveplate facers are being shell molded in a bronze alloy by Lakeside Bronze Foundry Co. *It is estimated that the machine time will be cut approximately 50 percent and that the tooling cost will be amortized over a quantity of 50 pieces.*

All radial slots in the casting, right, are cast to size and require no further machining. These were, of course, fully machined previously. Screw holes and drain holes near the outside diameter are also cast to size now.

continued next page

BY GEORGE C. KASTNER, Chief Engineer,
Waterbury Tool Div., Vickers, Inc.

Fast Tool Write-Off – cont.

Inherent advantages of the shell mold will provide other beneficial features such as high density, sound material and extremely clean cast surfaces. High permeability of the resin bonded shells provides effective venting that prevents gas entrapment, resulting in good casting quality.

Neither shell mold casting nor any other process can be expected to eliminate all secondary operations on critical dimensions. Therefore, machining of both faces to perfect flatness is required, as is the turning of two accurately-held circular grooves and the milling of semi-circular shaped port openings.

While the volume of production in this type of part is not very high, the fact that considerable milling is required when the part is machined is the major reason for the change to shell molding.

Even on the basis of this limited experience, it appears that a better piece can be obtained at lower finished cost. Although this is the first such casting to be used on a production basis, it is not likely to be the last.

- Hollow form minimizes machining. Cuts waste.
- Cost-conscious die casters are using it today.
- High Strength – Tough – High Red Hardness.
- Sizes from 16" O.D. x 12" I.D. to 2" O.D. x 1" I.D.
- Prompt deliveries from warehouse stock.
- Cut to any length.
- Free from decarb... Rough turned O.D., smooth bored I.D. and saw cut faces.
- Every bar furnace annealed... no scale.
- Full length spray painted with permanently identifying color.
- Heat treat card of matching color with each shipment.

Other Milne Tool Steels – both hollow and solid are being successfully used for parts such as trimming dies, cover dies and ejector dies. Also, Graph-Mo® hollow is being used for parts such as hydraulic shot cylinders and hydraulic closing cylinders.

Write today for free literature on Milne's die casting specialty steels. Address request direct to New York Office.

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BERYLLIUM CORP. INSTALLS NEW PROCESSING LINE

A new beryllium processing line has recently been installed for the Beryllium Corp. of America by the Continental Industrial Engineers, Inc. The new line consists of an electrically heated roller hearth type furnace with a special inert atmosphere generator, an automatic timed reciprocating quench and necessary control equipment. The new line is constructed for continuous, low labor automatic operation with exacting control on temperature, surface treatment and closely timed quench.

The new unit will handle coils up to 36 inches diameter and bars up to 2½ inches by 20 ft. long at a rate of about 2000 lbs. per hour.

KNAPP COMPANY TAKES OVER LARGER PLANT

To meet increased production demands and to improve manufacturing facilities, the James H. Knapp Company, has moved into its new plant at 1731 Workman Street, Los Angeles 31. The announcement was made by Harry L. Oppenheimer, president.

Some 151,000 square feet of the new location will be used immediately in the expansion by the company, who specialize in industrial furnaces and melting equipment.

PMM

Finishing Section

SURFACE FINISHING

Most precision metal molded parts receive some type of surface finish such as plating, organic coating, anodic coating, or chemical coating. This section includes information on the methods, processes and equipment used in these surface treatments.

A Section Devoted to Specialized Finishing of

Die Castings • Investment Castings • Powder Metal Parts
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Proved in commercial plating operations during nickel controls...

the UNICHROME BRIGHT NICKEL process is now available to all

Service-proved features include economy, stability, ease of control and sparkling nickel deposits with better receptivity for chromium plate

ALTHOUGH UNICHROME BRIGHT NICKEL is only now being made generally available, thousands of gallons have already been used to plate a wide variety of work . . . including brass, steel parts and intricate die castings. After 3 years of commercial operation, the Unichrome Bright Nickel process stands ready to deliver proved benefits to all platers now getting back to nickel plating production.

MORE DEPENDABLE OPERATION

This development of the United Chromium laboratories has simplified operations and reduced costs for the many companies using it.

Brighteners are unusually stable. As a result, fewer maintenance additions are required and costs are thereby reduced. Control of the three Unichrome addition agents—just two brighteners and an anti-pitter—is unsurpassed for simplicity. All addition agents being liquid solutions of highly soluble materials, maintenance additions are easily and quickly made and there are no problems from brightener drying on the work or crystallizing on tanks when the solution is cooled.

Another proved advantage of Unichrome Bright Nickel is excellent tolerance for contaminants, both metallic and organic. Need for purification treatments is reduced and much downtime is eliminated. Result: Still more economies and fewer operating problems.

With excellent tolerance for impurities and simple control, the Unichrome Bright Nickel solution is easily kept in prime plating condition. That means sustained brilliance of deposits, high rate of brightening, good leveling, and wide bright plate range.

SUPERIOR DEPOSITS

The Unichrome Bright Nickel process produces a brilliant ductile deposit that is whiter than usual—an advantage which gives subsequent chromium deposits an appearance of greater sparkle and makes chromium "misses" less obvious. Of even greater importance is the excellent receptivity of Unichrome Bright Nickel for chromium plate. In one operation bright chromium has been deposited *without activation* on Unichrome Bright Nickel deposits exposed to the air for as long as several hours. Having low internal stress, these nickel deposits show less tendency toward cracking in service, provide superior protection against corrosion for the basis metal.

You can install Unichrome Bright Nickel process easily and quickly. And since it uses a Watts type bath, you can easily convert your similarly based bright nickel to the Unichrome Nickel process and gain all of its benefits. Detailed literature is available at all offices of United Chromium, Incorporated.

UNICHROME Trade Mark COATINGS for METALS

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MORE and more plants are installing impregnating systems as an integral part of their production lines. Some experiences of plants using the Tincher Products impregnating system are described here.

Metallic Sealing Compounds Can Be Used For

Production Impregnation

IMPREGNATION of pressure castings with metallic sealant compounds is being widely used today. Among the users are some of the largest, most efficient mass producers in the country. For many, impregnation is done as a routine production operation to insure quality castings.

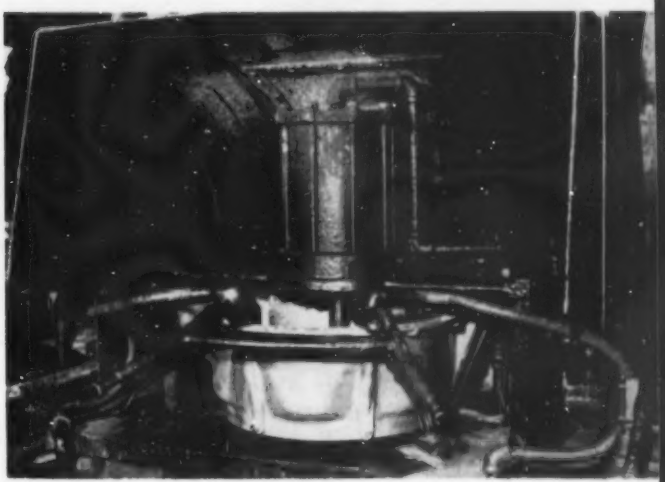
Porosity in otherwise perfect castings has always been a major problem to producers and users of pressure castings. Recent advances in the art of casting impregnation with metallic and plastic sealants, however, has greatly reduced the seriousness of this porosity problem and with it manufacturing and maintenance costs.

For example, one report indicates that metallic sealants penetrate more deeply and make a more positive seal when the tiny metallic oxides which expand within porous passages to form a permanent seal are in a balanced proportion of sizes. At least one sealant manufacturer is now making a metallic sealant with this proportional sizing of oxides.

New developments in the plastic sealant field are greatly

continued next page

1. DIE CAST ALUMINUM housing is clamped in a special fixture sealing off all oil passages. Heated metallic sealant is circulated through the passages under pressure.



2. AFTER IMPREGNATION, the castings are tested at 90 psi in a water-filled, lighted tank. Casting is observed through windows in the tank to detect air bubbles. Photos courtesy Tincher Products Co.

BECAUSE Hydro-Finish employs fine mesh abrasives suspended in water, it does a precision cleaning job without danger of excessive metal removal. Tolerances are held to .0001"! Result: more years of service from your dies!

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Mass Production Sealing Cont.

increasing the effectiveness of this type of sealant material. Extremely coarse porosity can now be sealed with many of the plastic sealants available. Shrinkage, a serious disadvantage to this type of sealing material in the past, has been minimized to a point where it does not impair the effectiveness of the seal.

Plastic sealants that are water washable are on the market eliminating a fire hazard due to the volatile solvents necessary for washing castings after impregnation with old-type plastic and varnish compounds. Storage "life" has also been increased and refrigerated storage is not required for some of the new types of plastic sealants.

Sealant manufacturers warn, however, that these new developments do not mean structurally unsound castings containing blowholes, cracks, and large voids can be effectively sealed and made perfect.

Equipment for applying the sealant to the castings and special fixtures for holding the castings during impregnation, are often available from the sealant manufacturers to meet the needs of the user exactly. These devices often put impregnation sealing on a high speed production basis.

Plating may be done very satisfactorily over the surfaces of impregnated metals. In fact, many companies use the impregnating process, not to correct leakage, but to fill up minute cavities which would otherwise collect plating chemicals and later, bleed out and spoil the plate. No separate treatment is necessary to insure a fully conducting surface before plating.

No plastic sealant is used with the metallic sealant. The sealants and their processes are distinct and separate. The only curing involved with metallic sealant is a period of 8 - 24 hours after impregnation, for the oxidation to be completed and the seal is thoroughly "set". The plastic sealant is "cured" by baking.

The examples presented here are typical of the users of impregnation sealing and the results they get.

continued on page 72

3. AUTOMOBILE TRANSMISSION parts, carburetor parts and brass bushings are among typical castings impregnated by a jobbing foundry in the Chicago area.

convert your portable tools into fast, efficient BELT GRINDERS

On every straight-spindle tool in your shop, you can "bring the abrasive belt to the work" with sturdy "61" PORT-A-BELT Grinding Attachments by CARBORUNDUM. You get versatility and economy unmatched by any other portable tool—fast, low cost grinding on *any* surface... even the awkward, hard-to-reach areas!

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Every PORT-A-BELT unit is equipped with CARBORUNDUM's famous "61" Contact Wheel, with its serrated rubber face. When used with CARBORUNDUM® Brand Abrasive Belts, these contact wheels give you smooth, cool, rapid cutting... without bounce or chatter. Belts last up to twice as long because they don't load up as fast.

PORT-A-BELT Grinding Attachments are precision-made, sturdy enough to take more than normal shop abuse. There's nothing to get out of adjustment!

YOUR CARBORUNDUM DISTRIBUTOR OR SALESMAN will show you how to convert your straight-spindle grinders into fast, efficient belt grinders. He's listed in the yellow pages under "Abrasives." Or, if you prefer, send the coupon.

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NEW PROTECTIVE COATING CHEMICAL FOR ALUMINUM

ALODIZING

Alodizing with "Alodine,"* a new technique in the protective coating of aluminum, was made available for production-scale use in 1946. Since that time Alodizing has largely supplanted the more elaborate, costly and time-consuming anodic treatments in the aircraft and other industries.

Continuous and successful industrial use has clearly demonstrated the simplicity and economy of the Alodizing process as well as the effectiveness of the "Alodine" amorphous coatings, particularly as a base for paint. In fact, the paint-bond that Alodized aluminum provides has been found to be superior to that possible with chromic acid anodizing.

The corrosion-resistance of unpainted aluminum Alodized with "Alodine" Nos. 100 or 300 is excellent, easily meeting the requirements of Specification MIL-C-5541. However, a need for protection of unpainted aluminum, even better than that obtained with chromic acid anodizing, has long been recognized.

NEW IMPROVED "ALODINE" DEVELOPED By ACP RESEARCH CHEMISTS

Several years of intensive research have now led to a new type of "Alodine," designated as "Alodine" No. 1200. This new protective coating chemical forms an amorphous mixed metallic oxide coating of low dielectric resistance that provides unusually high corrosion-resistance for unpainted aluminum. In addition, it forms an excellent paint bond that approaches closely the high quality obtained with the earlier types of "Alodine."

After having been tested for conformance with Specification MIL-C-5541, "Alodine" No. 1200 is now about to go into production.

PROCESS DETAILS

"Alodine" No. 1200 is the only essential chemical needed to prepare the coating bath and the final rinse bath. One of its unique features is that it can be used in tanks in an immersion process, or, in a multi-stage power washer in a spray process, or, with a slight adjustment of pH, with brush or portable spray equipment in a manual process. This means that even where the simple production equipment is not available, or where touching up of damaged coatings previously Alodized or anodized is required, excellent protection and paint bonding can still be obtained with practically no equipment.

All three methods of application easily meet the requirements of Specification MIL-C-5541.

Process sequence for all three methods of application is the same as for other standard grades of "Alodine" such as Nos. 100, 300, and 600, viz.: 1. Pre-cleaning. 2. Rinsing. 3. Alodizing. 4. Rinsing. 5. Acidulated rinsing. 6. Drying.

Coating time in an immersion process ranges from 2 to 8 minutes and in a mechanized spray process is about 30 seconds. "Alodine" No. 1200 baths are operated at room temperatures (70° to 100°F.) and heating is required only if the bath has gotten cold after a "down" period.

RECOMMENDED USES FOR "ALODINE" No. 1200

"Alodine" No. 1200 is specifically recommended for coating wrought products that are not to be painted or are to be only partially painted; and for coating casting and forging alloys whether or not these are to be painted. "Alodine" Nos. 100 and 300 are still recommended for coating wrought products such as venetian blind slats, awnings, etc., that are invariably painted.

RESULTS OF TENSILE TESTS

This new "Alodine" not only retards visible corrosion and pitting, but as shown in the table below, the loss of ductility with "Alodine" No. 1200, both brush and dip, after 1000 hours salt spray was less than for chromic acid anodizing after 250 hours, and for "Alodine" No. 100 and a conventional chromate treatment after 168 hours exposure.

PROCESS	SALT SPRAY EXPOSURE	COMPLIANCE WITH TENSILE REQUIREMENTS OF MIL-C-5541
CHROMIC ACID ANODIZING	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	fails
	1000 hrs.	fails
BRUSH "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 100	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails
CONVENTIONAL CHROMATE TREATMENT	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails

*"Alodine" Trade Mark Reg. U. S. Pat. Off.

CHEMICALS ACP PROCESSES

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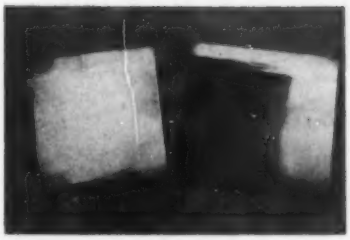
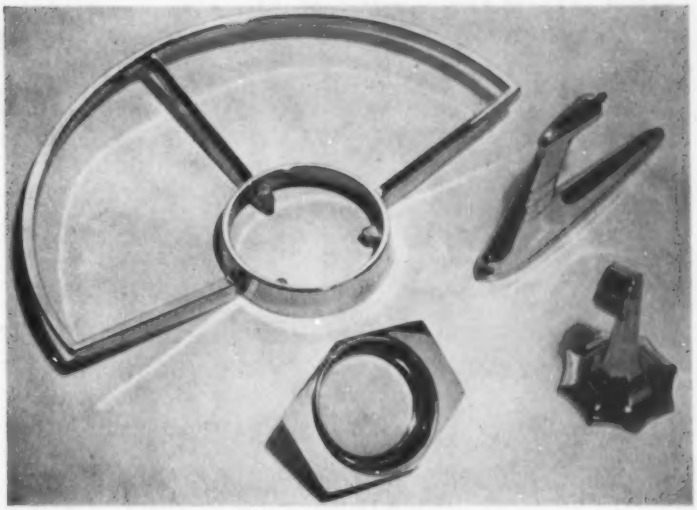


1. HULL CELL panels showing the difference in the area that is bright with the new process and a typical older bright copper bath.



2. TYPICAL SHAPES that can be bright plated in the new type bath without special anodes, burning, or loss of detail at sharp corners. No buffing is required after plating.

Company Reports Operating Characteristics of . . .

New Bright Copper Process

A NEW bright copper process has been developed which, it is claimed, increases the efficiency of copper deposition to as high as 98 percent, as compared with a standard copper bath efficiency of 70 percent.

The new process was developed by Smoothex, Inc. of Cleveland, Ohio, and is used in a cyanide Rochelle salt type copper bath.

In addition to the high electrical efficiency secured when these brighteners are used in the bath, the current density can be very materially increased without any danger of burning of the copper deposit. The difference between the new bath and the older, so-called standard copper baths is illustrated in Figure 1, where two panels from a Hull cell are shown. The panel on the right is from a standard bright copper bath using three amperes. The burned area extending over approximately 80% of the panel can be seen. This contrasts with the panel on the left containing the new brightening agents, where less than 30% of the panel is not bright.

As an example of the savings due to the higher efficiency and the possibility of using a higher current density, some of the zinc die cast ornaments shown in the illustration were bright copper plated in ten minutes, whereas in a standard, semi-bright bath, to secure the same weight of copper, 19 minutes would have been required.

Another advantage of the bath, it is claimed, is that it operates at a lower temperature—from 140 to 160F.-as compared with the semi-bright baths which must operate from 170 to 190F. The lower temperature is said to bring a marked saving in heating costs, and reduces odors, va-

continued next page

pors, decomposition of the cyanide, and almost completely prevents the formation of carbonates in the bath.

On some parts such as the horn ring shown in the illustration, the normal bath will not throw particularly well in the sharp corners where the current density is low. With the new bright bath, the manufacturer reports that the current density over the entire range is essentially uniform, so that the same weight of deposit and the same degree of brightness is secured all over.

The cost of the brightener, once the bath has been prepared, is approximately .035c per ampere hour. The decrease in time in the bath and the fact that no buffing must be done after copper plating shows a far greater saving than the cost of brightening chemicals. One of the major advantages claimed by the manufacturer of the brightening agents is that the parts, after copper plating, can go directly into the nickel bath if it is used, or into the chromium bath, without having to be removed, dried, buffed, and re-racked before going on in the plating operation.

ELECTROCHEMICAL SERIES

With the publication this month of "Modedrn Electroplating," John Wiley & Sons launches a definitive series of books developed and sponsored by The Electrochemical Society. The new volume is edited by Allen G. Gray.

An integrated book containing the latest theory and practical aspects, "Modern Electroplating" originated as the published papers and discussions of the 1941 symposium of The Electrochemical Society. These and additional studies, completely revised and rewritten by 39 specialists, from the present work.

As a result of this combined effort, all the common metals and alloys and their accepted plating methods are covered. Uncommon metals and their potentials are also reviewed and the specialized problem of plating on aluminum and magnesium considered. Each chapter is organized according to this pattern: principle; function of constituents of bath; operating conditions; maintenance and control; preparation of basis metals; and finishing of deposits.

APPOINTS FRANK M. HUNTER

Frank M. Hunter has been appointed service engineer for Acheson Colloids Company Port Huron, Mich. to serve all of northern and lower Michigan, with headquarters at 3000 East Grand Blvd., Detroit 2, Mich.

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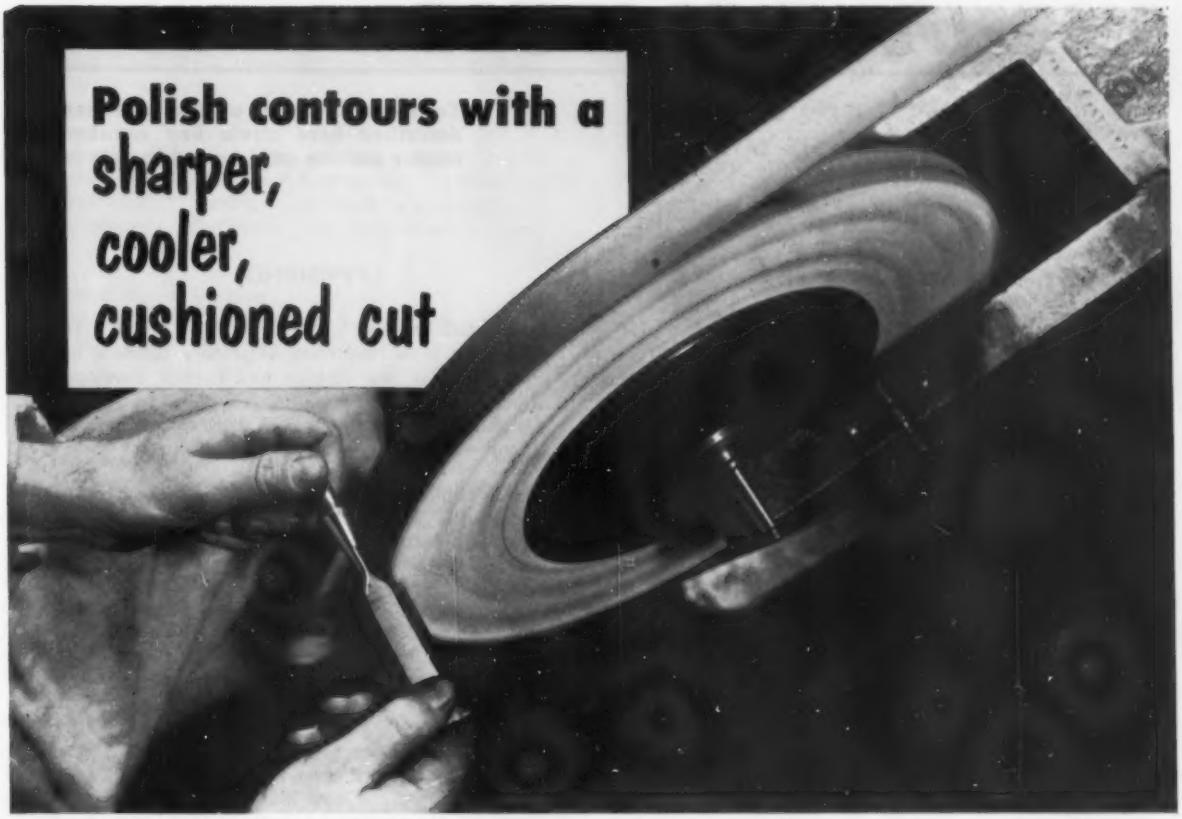
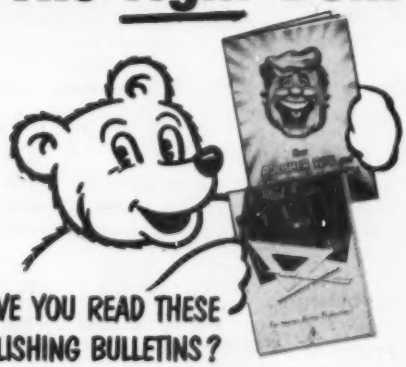


The right Behr-Manning Abrasive Belt



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"HOW POLISHER PETE PUT ECONOMY IN POLISHING" contains up-to-the-minute data on belt selection, etc.

"BLUEPRINTS FOR BETTER, FASTER PRODUCTION" contains case histories of contour polishing and other "tough" abrasive finishing jobs. Write for both copies today. Address Behr-Manning Corp., Troy, N. Y., Dept. PM-1

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USEFUL LITERATURE

To receive copies of the publications described here circle key number on reader service card bound in this issue.

MATERIALS & EQUIPMENT

Gas-Oil Burners 150
A bulletin describing the new self-contained burner for use with either oil or gas is available from Eclipse Fuel Engineering Co.

Induction Heating Generator 151
Induction heating generators for brazing, soldering, hardening, melting, etc. are described in a bulletin from Induction Heating Corp.

Air & Hydraulic Cylinders 152
Bulletin No. 800 describes the complete line of heavy duty air and hydraulic cylinders manufactured by Lindberg Engineering Co.

Temperature Control Equipment 153
Wheelco instruments for all types of temperature control and indication are described in a bulletin available from the Wheelco Instruments Div. of Barber-Colman Co.

Industrial Mixers 154
Two new pamphlets by Conn & Co. describe the complete line of standard industrial mixers made by that company.

Controlled Atmosphere Furnace 155
In a 6-page folder, Surface Combustion Co. describes the outstanding features of their Allcase batch type controlled atmosphere furnaces.

Furnace Control Book 156
A new book containing detailed engineering specifications and complete information on control systems for furnaces, oven, kilns, etc., has been issued by The Bristol Co.

Metallic Stearates 157
Bulletin No. 5-1 describes the applications and properties of zinc stearates for use as powder lubricants in the powder metallurgy industry. Available from M. W. Parsons-Plymouth, Inc.

Die Casting Die Steels 158
A 4-page brochure describing the properties and uses of CSM 2 die casting die steel is available from the Crucible Steel Co. of America.

Projection Comparator 159
A new brochure describing the AO optical projection comparator has been issued by Optical Gaging Products, Inc.

Alloy Sintering Trays 160
A 12-page brochure is available from Alloy Engineering Co. describing their complete line of alloy sintering trays and baskets for heat-treating and sintering.

FINISHING

Carbide Belt Finisher 165
A leaflet from Hammond Machinery Builders, Inc. describes the new carbide tool finisher developed by the company. The finisher is a belt type machine employing a silicon carbide belt with a carbide faced work platen.

Fastener Handbook 166
A 22-page data book describing the line of fasteners and giving basic application data has been issued by the Southco Div. of South Chester Corp.

Tumbling Barrel Catalog 167
A 12-page illustrated catalog showing the company's complete line of horizontal and tilting type Globe tumbling barrels has been released by Hupp Corp.

Microfinish Comparator 168
To provide a quick check on surface finish, comparator blocks are now available. These are described in a 4-page brochure available from the Baptist Machine Co.

Spray Masks, Stencils 169
Descriptive literature about a new plastic (putty like) material for making spray masks, stencils, etc., that hardens in a few hours can be secured from the Chemical Development Corp.

Electroplating on Aluminum 170
The Technical Advisor, No. 23, contains an article on the electroplating of various materials onto aluminum. A copy can be secured from Reynolds Metals Co.

Mask-Washing Machine 171
A small mask-washing machine to be used by the paint spray operator at the work station is described in a brochure that has been issued by Conforming Matrix Corp.

Electronic Cores 172
An 8-page engineering bulletin is offered by Stackpole Carbon Co., giving application data, dimensions, and other design and engineering data on ferro-magnetic cores. A 16-page insert contains graphs of physical and electrical characteristics.

Vacuum Engineering 173
Vacuum furnaces and vacuum impregnating equipment are described in two bulletins, a 4-page folder on furnaces and a 24-page brochure on impregnation. Engineering data, applications, and equipment are fully illustrated and covered in this literature from F. J. Stokes Machine Co.

Casting Impregnation 161
Plastic impregnation of castings, what it is and what it will do, is described in a folder from Polyplastex International, Inc.

Condensing Filters 174
A brochure from Air-Line Engineering Co. describes the line of condensing filters made by that company to remove oil and water from compressed air lines.

Mounted Wheel Catalog 175
Catalog No. 30, eight pages, in color has just been released by Metal Removal Co. The catalog covers all types, sizes and kinds of mounted abrasives points, mandrels and polishing wheels.

High Density Powder Parts 176
Parts produced from iron powder having densities as high as 7.7 grams per cubic centimeter and tensile strengths over 180,000 psi are described in a brochure published by Pow-Met Industries, Inc.

Plating Rack Coating 177
A new plating rack coating, No. 218X, is described in a leaflet available from United Chromium, Inc. According to the manufacturer, the new coating cuts expenses, reduces maintenance and lowers drag-out.

NEW! **RAMPE TWIN PRECISION BARREL FINISHER**

"THE MOST MACHINE FOR THE LEAST MONEY"

This sturdily built Barrel Finisher will handle steel burnishing balls in both barrels — is amply powered by a ¾ H.P. 220 volt 3-phase motor for standard 10¾" x 17" barrels or larger barrels, as desired.
Safety covers for barrels prevent pressure build-up. Starting button is water proof. Has ball bearing variable speed drive. 2 tote boxes are standard equipment, — also perforated covers for barrels. Lined barrels are coated with vinyl plastic.

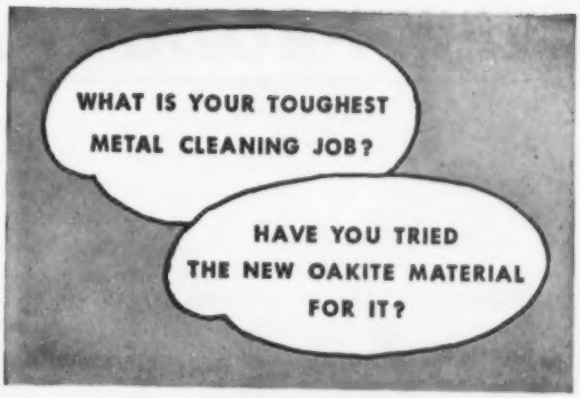
WITH UNLINED BARRELS $535.00

WITH LINED BARRELS $515.00
F.O.B. Factory Cleveland, Ohio

Write for literature and complete information.

RAMPE MANUFACTURING CO.
3320 ST. CLAIR AVE. • CLEVELAND 14, OHIO

For additional information Circle No. 81 on the Reader Service Card

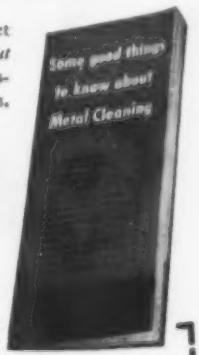


During the past year, the Oakite Chemical Research Laboratory has produced 16 new materials for performing the following metal cleaning and processing operations:

1 **Heavy-duty cleaning in tanks**
2 **Etch-cleaning aluminum**
3 **Washing in pressure-spray machines**
4 **Electrocleaning zinc-base die castings**
5 **Putting heavy zinc phosphate coatings on steel in preparation for painting**
6 **One-operation cleaning, pickling and conditioning for painting**
7 **Stripping paint**
8 **"Killing" paint in spray booth wash water**
9 **Drawing and forming**

One of these new materials may be the right answer for some problem that's been giving you a lot of trouble. Just circle the job number in the coupon, and let us tell you about the new chemical designed for the work.

FREE Our 44-page illustrated booklet *"Some good things to know about Metal Cleaning"* has been revised to discuss the application of the 16 new materials.



SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of U. S. and Canada

OAKITE PRODUCTS, INC.
340 Rector St., New York 6, N. Y.

Send me a FREE copy of *"Some good things to know about Metal Cleaning."* Also, give me more information about new Oakite materials for the jobs listed in your advertisement, as indicated by the numbers circled below:

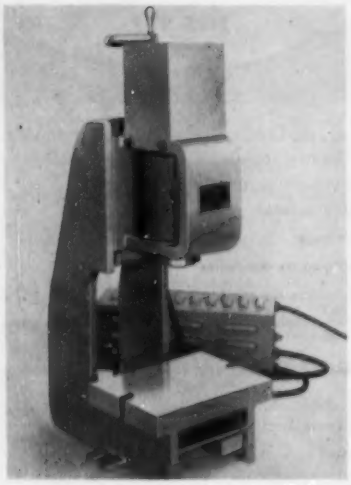
1 2 3 4 5
6 7 8 9

NAME_____
COMPANY_____
ADDRESS_____

For additional information Circle No. 56 on the Reader Service Card

NEW PRODUCTS

For additional information on these products circle key number on reader service card bound in this issue.



ELECTRIC IMPACT HAMMER . . . stakes, rivets, clinches

Designed for production line riveting, staking, cutting, marking, etc. a new electric impact hammer is now available.

The hammer is, basically, a single stroke unit that is so set that no matter how long the switch is held closed, only one stroke will be made and the hammer will stop at the bottom of its stroke. Where repetitive strokes are desired a separate control box, to be inserted between power source and the machine, is available that will cause the machine to give 3 blows per second for as long as the switch is closed.

Available units will give a stroke of from 1¼ to 1¾ inches with a maximum impact of from 1500 to 3500 lbs. The impact can be varied from a few ounces up to maximum rated capacity by varying the input voltage.

Black & Webster, Inc.
For more information circle No. 198 on the Reader Service Card

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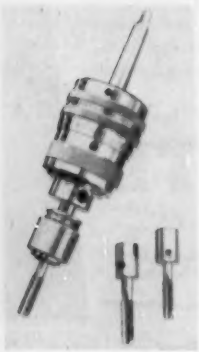

IMPORTED TAPPING HEAD . . . to reduce tap breakage

Developed to render maximum capacity and reliability of operation, no matter what type of material is used, the new tapping attachment has been engineered to reduce tap breakage and cut costs considerably.

The new unit is said to be able to do any kind of tapping efficiently. A feature is the extreme accuracy of torque. Transmitted through a sensitive disc clutch, accurate control is gained by simply turning the sleeve in either direction.

The sleeve is also graduated, so that the operator can set the required torque instantly when consecutive tapping of various size holes becomes necessary.

Homestrand, Inc.
For more infromation circle No. 202 on the Reader Service Card

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NEW GRATING SPECTROGRAPH . . . offers ultra high dispersion and resolution

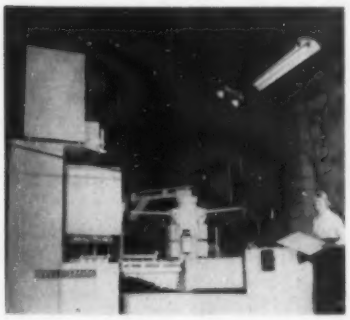
The first instrument of its type to become commercially available, a new plane grating spectrograph that offers special advantages in analyzing isotopes, in the study of line shapes, or in any analyses problems involving high dispersion or low concentration is now in production.

Based on an early design by H. Ebert, the new instrument in completely stigmatic and has been specifically developed to produce ultra-high dispersion and resolution while covering the 2000 to 6500 Angstrom unit range at a single setting.

Resolution of the new spectrograph ranges from 75,000 in the first order to 600,000 in the eighth order. Resolution is guaranteed to be 100,000 at 3000A units, while the practical speed equals the well-known Wadsworth grating spectrograph.

Jarrell-Ash Co.
For more information circle No. 200 on the Reader Service Card

SHELL MOLD MACHINERY
. . . automatic and semi-automatic



An advanced line of machinery for shell molding has been placed on the market. The new line of automatic and semi-automatic shell mold equipment has been engineered to give high speed production.

In addition to the shell mold machines, a complete line of supplementary equipment is offered as well as a comprehensive consulting service.

Beardsley & Piper Div.
Pettibone Mulliken Corp.
For more information circle No. 197 on the Reader Service Card

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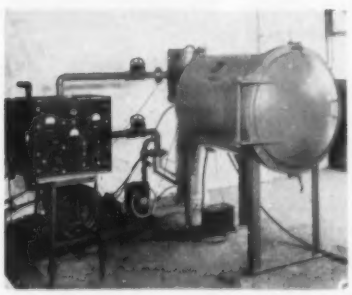
FINISH FOR DIE CASTINGS
. . . costs less than plating



To help the many manufacturers and finishers of die cast objects who still employ the more expensive process of polishing and electroplating, a new 30-inch vacuum metallizing unit has recently been developed.

With vacuum metallizing, an initial coating of lacquer is applied to the surface of the object to be finished just as it comes from the mold. Then a very thin film of evaporated aluminum is added to this and a final coating of clear lacquer to give durability to the mirror like aluminum finish. This top coat of lacquer can then be dipped into a water-soluble transparent dye with a resulting brilliant, rich-looking gold, bronze, brass, silver or gold metallic finish.

Elimination of the buffing and polishing of the castings prior to finishing represents a major cost reduction.

High Vacuum Equipment Corp.
For more information circle No. 196 on the Reader Service Card

FLEXIBLE SHAFT UNIT
. . . has quick change handpiece

A new quick change handpiece for Strand flexible shaft machine which eliminates the need for tools of any sort in changing the working attachment affixed to the end of the flexible shaft has recently been introduced.

The new handpiece cuts the time required for changing tools to only a few seconds. The device is fitted with a spring lock retaining button.

To change the handpiece, all the operator does is press the button, pull the entire hand-

continued next page

It's practically
WATER-WHITE
a NEW
chemically resistant
baking finish—
DURACHEM

For all types of metal products from heavy hardware to fine jewelry

Here is a new baking type synthetic finish for metal parts that combines unusual clarity with a high degree of chemical resistance.

Product of Maas & Waldstein Co. research, DURACHEM is almost water-white in color—and retains its clarity even after prolonged exposure to heat and sunlight. It also protects metal parts against the effects of salt spray and perspiration.

Typical applications include builders' hardware, vanity and cosmetic cases, lipstick shells and pen caps.

Where decorative color effects are desired on metal, DURACHEM can be supplied in a range of colors with the same chemical stability as the clear finish.

Samples and technical literature are available on request. Or an M & W technical consultant will discuss your requirements privately with you.

OUR 78th YEAR — PIONEERS IN PROTECTION — M&WCº 1876

MAAS & WALDSTEIN CO. NEWARK 4, NEW JERSEY

MANUFACTURERS OF INDUSTRIAL FINISHES

For additional information Circle No. 55 on the Reader Service Card

THREADED FASTENERS

need a firm grip, too!

A threaded assembly that fails to hold under the stresses of ordinary use, can lose customers quickly. To prevent stripping or excessive wear of tapped threads in modern structural materials, a hard steel threaded bushing is required.

Of the several types available, TAP-LOK INSERTS* are outstanding in the advantages they offer the design engineer. They are threaded externally to tap into a drilled or cored hole equal in size to a tap drill hole that will accommodate the external thread. Slotted segments at one end provide cutting edges that enable these inserts to tap their own threads in the boss.

They save substantial time and cost in assembly because they require no separate tapping operation, special hole preparation, or secondary staking. No crossing of threads is possible.

Used mainly in original equipment applications, TAP-LOK INSERTS are excellent, also, for salvaging threaded parts that have been stripped in assembly.

Send for descriptive folder

Also manufacturers of Groov-Pins for positive locking press fit.

GROOV-PIN CORPORATION

1122 Hendricks Causeway Ridgefield, New Jersey

For additional information Circle No. 40 on the Reader Service Card

piece and the permanently affixed tool away from the shaft and snap a new handpiece and tool into place.

Users of flexible shaft equipment will find that this innovation will allow operators to put more working time into actual production, thus increasing output per hour. Users of the handpiece will find it convenient to have one handpiece for each of the most commonly used tools.

Franklin Balmar Corp.
For more information circle No. 201 on the Reader Service Card

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SHEAFFER STARTS NEW TOOL AND DIE DIVISION

The Sheaffer Pen Company has embarked on a new operation with the opening of a modern $1,500,000 tool and die plant at Fort Madison, Iowa.

The pen company's tool and die division is housed in a new one-story air-conditioned and humidity-controlled building specially designed and constructed for it.

"Into this new plant," said W. A. Sheaffer II, president, "we have put the newest and finest machinery and equipment for any industry."

The new plant will produce tools, dies, and fixturs and special machines for other companies throughout the nation as well as for the pen company.

Heading Sheaffer's newest division is A. A. Zuber, formerly vice president and a director of the Carver Pump Co. of Muscatine, Iowa, and before that assistant to the superintendent of production at the Rock Island, Ill. Arsenal. In his new post as general manager, Zuber supervises approximately 40 employes at the new plant.

Circle No. 27 on the Reader Service Card →

ALMCO

Supersheen

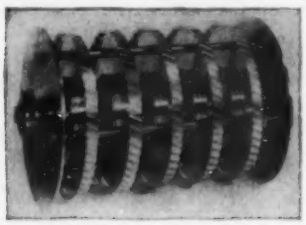
SPEED FINISHING

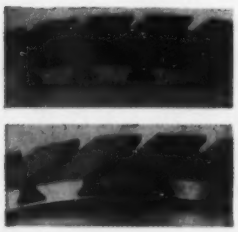
ALBERT LEA, MINN.

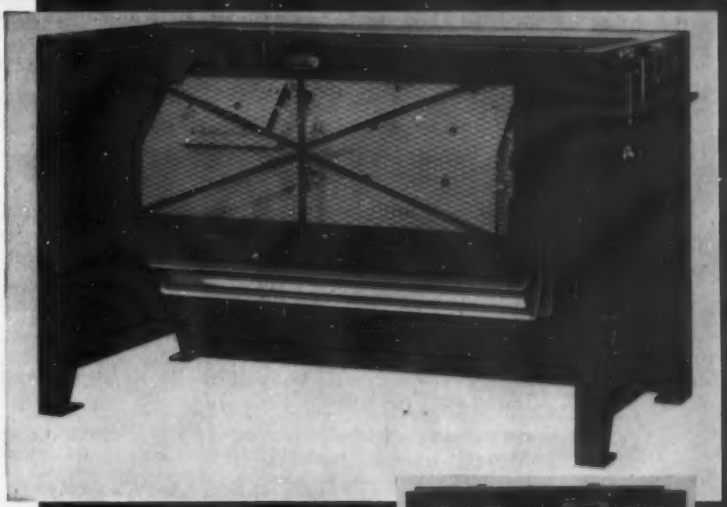
FIXTURE MACHINES FOR SPECIAL FINISHING PROBLEMS

NOW . . . the tremendous cost savings of Supersheen Speed Finishing available for large, heavy, delicate, or close tolerance parts!

TYPICAL PARTS PROCESSED BY SUPERSHEEN FIXTURE MACHINES







OPENING NEW FINISHING HORIZONS TO AMERICAN INDUSTRY

Supersheen Fixture Processing has greatly expanded the field for modern barrel finishing. Now many parts—formerly impossible to barrel finish—can be Supersheen finished at enormous cost savings. Supersheen Fixture Processing eliminates all former costly hand methods of filing, deburring, etc., thereby making great savings possible.

WHAT IS YOUR PROBLEM? Write us about your specific parts finishing requirements. We'll gladly show you how Supersheen can save you a great deal of money.

Free Catalog

Get the complete money-saving facts. Send the coupon for the new extremely complete 52-page catalog "Supersheen Speed Finishing." See scores of "before and after" pictures of many different parts. Learn the latest on new equipment and compounds. LEARN HOW SUPERSHEEN FIXTURE MACHINES CAN SAVE YOU MONEY.

MAIL COUPON TODAY!

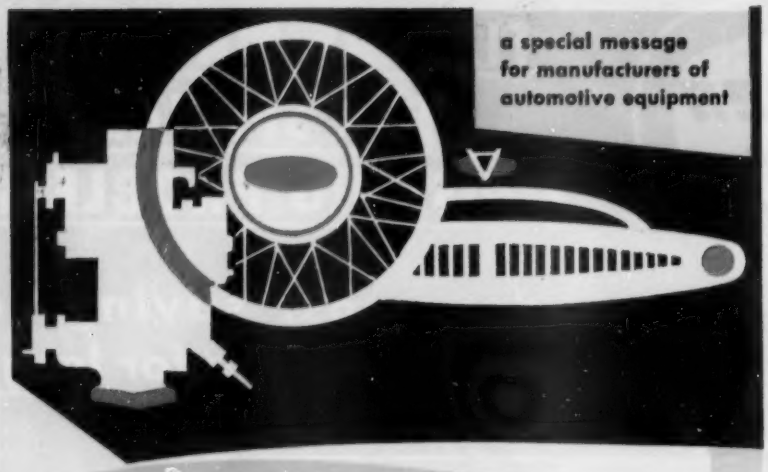
Almco Supersheen, Queen Stove Works, Inc., Dept. D-1
Albert Lea, Minnesota

Gentlemen: Please rush me your new catalog "Supersheen Speed Finishing" and complete details on your Fixture Machines.

Name_____ Title_____

Address_____

City_____ State_____



need a finish for low cost corrosion protection or showroom sparkle?

specify

IRIDITE®

Whether you're finishing non-ferrous parts for high corrosion protection, paint base, or for showroom sales appeal, you can be sure of low material and production costs and peak performance when you specify Iridite. Here's what you can do with Iridite:

- **ON ZINC AND CADMIUM** you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.
- **ON COPPER . . .** Iridite brightens copper, keeps it tarnish-free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.
- **ON ALUMINUM** Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.
- **ON MAGNESIUM** Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

Iridite is approved under government specifications

ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD.

Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals, ARP Plating Chemicals.
WEST COAST LICENSEE: L. H. Butcher Co.

For additional information Circle No. 39 on the Reader Service Card

PRODUCTION SEALING
continued from page 60

As a guarantee of quality in one of America's favorite brands of a consumer "hard goods" item, the manufacturer impregnation seals several of the important pressure castings that go into the product.

All production of one component, a die cast aluminum housing, is impregnated with Tincher metallic sealant to prevent possible seepage from oil passages which are cast integral with the housing. Some small degree of porosity is inherent in the castings because of the complex coring necessary to cast the passages within the housing. This manufacturer has found Tincher sealing to be a completely satisfactory method of insuring quality in the finished housing, despite the porosity problem.

With production of the housing running far into the thousands, the sealing operation is on a mass production basis, operating two shifts per day with fast, semi-automatic equipment.

The housings are clamped in a special fixture which seals off all passages in the oil line. Metallic sealant at about 180F. is circulated through the passages for one minute. Pressure at 100 psi is applied to the sealant in the passages for two minutes. The sealant is drained off, the housing removed from the fixture, and the oil passages flushed with water to remove any excess sealant.

After impregnation, housings are tested in a water-filled, lighted tank. The housing is immersed in the tank and air pressure at 90 psi introduced into the oil passages. The housing is observed for air bubbles that would indicate unsealed porosity by means of glass "windows" in the sides of the tank. This final test in-

sures oil tightness of the casting passages and serves as a positive check on sealing effectiveness.

Independent Foundry

One Chicago area foundry has used metallic sealing for more than four years on many types of pressure castings made from brass, aluminum and iron. Their experience has shown that porosity, which occurs mainly at the junctures of heavy and light sections, can be effectively sealed by this method.

No testing for porosity is done at the foundry. All production is sent to customers who make the tests and return any porous castings to the foundry.

This practice, which is fairly common in industry, serves as a guarantee of casting quality to the customer. The customers' own tests reveal any porosity in untreated castings and provide a check on impregnation effectiveness. This foundry has had very few rejects after impregnation with Tincher sealant.

As an additional source of revenue, the foundry uses its equipment for impregnation of castings produced by other foundries. Typical of the castings handled are automobile transmission parts, carburetor parts and brass bushings.

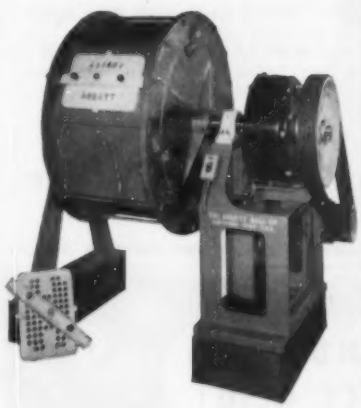
Shown, Figure 3, are typical castings that have been impregnated at this foundry.

The cost of sealing porous castings has been reduced and the permanency of the seal has been increased by substituting metallic impregnation sealing for a varnish type sealer formerly used at Progress Pattern and Foundry Co., Figure 4.

continued next page

4. LEAKER castings are being lowered into the autoclave on the operator's right. Typical sealed castings are shown below, including water line fitting, outboard motor parts, and chain saw parts.

The ABBOTT METHOD



will do MOST of your BARREL FINISHING

Constant research and production line operations, developed and improved by Abbott engineers for more than forty years, conclusively PROVES that the Abbott Method of Barrel Finishing will efficiently perform most of your barrel finishing tasks.

The Abbott Method — originated by The Abbott Ball Company in 1910 — features the famous Abbott Vertical Barrel and Abbott's scientifically designed Burnishing Shapes.

For superior barrel finishing of stampings, castings and machined parts . . . investigate The ABBOTT METHOD.

Improved Abbott Barrel!

The famed Abbott Vertical Barrel — adjudged by experts as the most efficient in its field — has been improved! Self-contained, it features its own electric motor and speed control which gives precision control of barrel speeds at all times. Four basic barrel sizes in a combination to match any production requirement. Write for details . . . today!

THE ABBOTT BALL COMPANY
1084 NEW BRITAIN AVE.
HARTFORD 10, CONN. U.S.A.

Abbott Burnishing Shapes

ABBOTT ABCO & ECLIPSE BALLS
ABBOTT DIAGONALS
ABBOTT CONES
ABBOTT OVALBALLS
ABBOTT PINS
ABBOTT BOBS
ABBOTT DISCS

USE ABBOTT . . . THE SHAPE THAT COUNTS

ABBOTT

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For additional information Circle No. 65 on the Reader Service Card

ZINC AND ALUMINUM DIE CASTING
by NELSON METAL PRODUCTS, INC.

Example of a large Die Cast hinged assembly acceptable for chrome plated finish made possible by using our modern die casting machines and die making facilities.

Wall box, zinc castings, size 11" x 14" x 5" deep.

Nelson metal products, inc.
510 32nd St., S.E. GRAND RAPIDS 8, MICHIGAN
SALES OFFICES: GRAND RAPIDS • DETROIT

MODERN DIE-CASTING THAT MEETS EVERY PRODUCT NEED!

NE

Our modern plant, with 40,000 square feet of modern facilities and complete design and engineering services, assures you the ultimate in die casting quality for every product need.

NEW ENGLAND DIE-CASTING CO.
West Haven Connecticut

For additional information Circle No. 66 on the Reader Service Card

Ease of cleaning excess metallic sealant from castings brings the cost of this sealing method below that for varnish sealed castings, this company reports. Only one rinsing in water is necessary to clean metallic sealed castings compared to at least two baths in expensive solvents for those treated with varnish. The metallic seal is more permanent, according to the foundry, because it is not adversely affected by heat and certain solvents as are varnish sealants.

One batch of 40,000 castings in which three percent proved to be leakers were impregnation sealed at the Progress plant. There were no rejects after the sealing.

Other recent jobs include a batch of ductile cast iron hydraulic castings which had to remain pressure right at 1000 psi. The entire production of this casting leaked because of a tough core problem which could be solved only through the use of two chaplets. Voids around these chaplets were sealed with complete success, saving the entire batch of castings and hundreds of dollars.

A number of gasoline fittings have been impregnated at this plant, many of which are used on aircraft.

Leaker castings in the basket in front of the operator in Figure 4, *above*, are lowered into the autoclave at the operator's right hand, the cover is tightly closed and the air evacuated. Hot sealant from the rectangular tank at right is then drawn in by the vacuum. When the autoclave is full of sealant, 85 psi is applied inside the autoclave for 15 minutes to drive the sealant into the castings. The basket and castings are then rinsed in a tank of water next to the autoclave.

1. ELECTRIC P & H "ZIP-LIFT" hoists up to one-ton capacity make good use of these zinc alloy die castings. They include both halves of a control box and small mechanical elements that require little or no machine work.

2. ECONOMY in the manufacture of this electric hoist is promoted by using zinc alloy die castings for a control case and cover, a solenoid brake bracket and a limit switch sheave, among other components.

These Hoist Designers Get A Lift

from Low-Cost Zinc Die Castings

ECONOMY in manufacture along with excellent performance in service account for the use of the zinc alloy die castings shown in Figure 1, applied in the P & H "Zip-Lift" electric hoist, Figure 2, produced by Harnischfeger Corp., Milwaukee, Wis.

Some of these components could be sand cast in other metal but not to the close dimensions or with the smooth surfaces and detail refinement obtained, as cast, when produced as zinc die castings.

Chief among economy factors are those attained because little or no machine work is required. Most holes, even of small diameter and all recesses are cored to size and faces for gaskets are flat, as cast, so that good joints result without grinding or other machine work. Savings on these scores are largest and most significant.

In the few places where machining is done, only very light cuts are needed and metal loss is negligible. In some cases, walls are thinner than can be sand cast and this too promotes high economy in metal utilization.

Two of the castings include steel inserts, seldom feasible in sand castings but readily applied with noteworthy savings and other benefits in die castings. Appearance of the castings is excellent and contributes to ease of finishing. Although the larger die castings are primarily to enclose electrical components, others perform mechanical functions. None are designed to take lifting stresses.

For additional information Circle No. 63 on the Reader Service Card

ALUMINUM PLANER HOUSING

FEDERAL-Built dies and high pressure casting equipment with water hydraulic impact injection assure GREATER DENSITY and BETTER FINISH.

New and improved cold chamber casting machines at FEDERAL now produce larger than average die castings of superior quality.

Aluminum and Zinc Alloys

FEDERAL DIE CASTING CO.

2220 NORTH ELSTON AVE, • CHICAGO 14, ILL.
Phone ARmitage 6-4803

J. P. GILL ELECTED VANADIUM-ALLOYS HEAD

Directors of the Vanadium-Alloys Steel Co., Latrobe, Penna., have elected J. P. Gill, president of the company. Roy C. McKenna continues as chairman of the board in an active capacity as the chief executive officer of the company.

Vanadium-Alloys' new president joined the Company in 1920 as chief metallurgist; (he was elected vice president in 1943 and in 1945 was made chairman of the executive committee of the Vanadium-Alloys Steel Co. and subsidiaries.) He is now president of Colonial Steel Division of Vanadium-Alloys and was recently named president of Vanadium-Alloys Steel Canada Limited.

An extremely active member of the American Society for Metals, Mr. Gill has been interested in that organization's activities since its founding.

Spincraft
SKILL WILL DO IT
stainless steel
Ladles...

for die casting give you these advantages

- easier pouring
- increased output
- longer service life
- increased safety

Because Spincraft ladles of stainless steel are so much lighter in weight, because they are so resistant to high temperatures, because they so positively lower costs in all directions, they are now in use in over 200 die casting plants everywhere—including the country's leading producers. Write today for an informative bulletin illustrating Spincraft's wide range of ladle sizes.

Spincraft
SKILL WILL DO IT
INCORPORATED

4131 W. State St.
Milwaukee 8, Wis.

For additional information Circle No. 68 on the Reader Service Card

"BLIND DATES" MAY BE ALL RIGHT FOR VISITING FIREMEN,

but you can't afford to risk the quality and reputation of your product on an unknown source of supply:

Jersey Plastic & Die Casting Company has been in the business many years; we're proud of our long list of customers who keep coming back because they like the work we do. We invite you to investigate our plant, look at some of the thousands of different castings we have produced, and give us a chance to quote on your castings. Our engineers will gladly advise you on any technical problems you may have with your die casting designs.

It will pay you to look into this dependable source of die castings. Write for our free booklet.

JERSEY PLASTIC & DIE CASTING CO.
148 Shaw Avenue, Irvington
11, New Jersey

Circle No. 77 on the Reader Service Card

INDUSTRY NEWS

H. A. ACHESON RE-ELECTED TO HEAD COLLOID FIRM

Howard A. Acheson was re-elected president and chairman of the board of Acheson Industries, Inc. at its annual stockholders' meeting in New York City. Acheson Industries, Inc. includes Acheson Colloids Company, Port Huron, Mich., and Acheson Colloids Ltd., London, England, leading

Howard A. Acheson

manufacturers of colloidal graphite dispersions, as well as Acheson Dispersed Pigments Company, Philadelphia, Pa., and Gredag, Inc., Niagara Falls, N. Y.

Also, at the New York meeting, the following appointments were announced: Raymond Szymanowitz, vice-president; P. C. Buck, vice-president; M. W. Reynolds, vice-president; and John C. Sprague, secretary-treasurer. Mrs. Leatha Tuer and Lester H. Miller were elected assistant secretary and assistant treasurer, respectively.

Directors for the coming year are John P. Deringer, Raymond Szymanowitz, Pierre V. Heftler, and John C. Sprague.

FERRO SUBSIDIARY FORMED FOR POWDER METALLURGY

Formation of Ferro Powdered Metals, Inc., Salem, Indiana, a new, wholly owned subsidiary of Ferro Corporation, Cleveland, Ohio, has been announced by R. A. Weaver, chairman of the board.

The plant at Salem encompasses complete, new manufacturing, laboratory and office buildings and facilities. The equipment installed includes presses, sintering furnaces, mixing equipment, precision tools, and inspection devices.

C. D. Clawson, Ferro Corp. president, will head the new subsidiary as president, Charles B. Hughes will be vice-president and general manager.

Ferro Corporation is well-known for its manufacturing in diversified fields.

PANGBORN PLANS EVENTS FOR GOLDEN ANNIVERSARY

The year 1954 will mark the celebration of the Golden Anniversary of Pangborn Corp., Hagerstown, Md., manufacturer of blast cleaning and dust control equipment.

Thomas W. Pangborn, president, sold his first sand blast machine in New York City in 1904. John C. Pangborn joined his brother in the following year. Growth was rapid and a plant was established in Jersey City in 1909. These facilities were outgrown in 1912, at which time the business moved to Hagerstown.

Pangborn's facilities in Hagerstown include foundry, plate, sheet metal and machine shops, assembly plants, paint and woodworking shops. A beautiful public park, a gift of the Pangborn brothers to the city, is located adjacent to the plant.

A series of events are being planned to celebrate the Golden Anniversary Year culminating on Sept. 1, 1954, the official birthday of the firm.

REPUBLIC GROUND BREAKING

Peter Robertson, assistant vice president in charge of operations for Republic Steel Corporation, is shown above using a stainless steel shovel to turn the first spade full of earth at the site of Republic's new iron powder plant. Construction of the new $2,200,000 plant in East Toledo, Ohio, was begun in late November and is scheduled for completion in the summer of 1954.

VANADIUM-ALLOYS ADDS RESEARCH METALLURGIST

Vanadium-Alloys Steel Co., Latrobe, Penn. has announced the addition of Dr. John C. Hamaker, Jr., to the company's Metallurgical Research Department. Before joining Vanadium Alloys, Dr. Hamaker was plant Metallurgist for the General Iron Works Co., Division of Stearns-Rogers Manufacturing Co. at Denver, Colo.

Born in Canton, Ohio, Dr. Hamaker was educated in Massilon, Ohio schools, and later attended the University of Michigan, receiving the Bachelor of Science Degree in 1945, the Master of Science Degree in 1947 and the Degree, Doctor of Philosophy in 1952.

In 1947, while attending the University, he was awarded a research fellowship sponsored by the International Nickel Company and was employed in that company's Research Laboratory at Bayonne, N. J., during the Summer of 1948. He was with Foundry Services Inc., New York City in 1950 and 1951.

NAME NEW VICE PRESIDENT OF ALUMINUM INDUSTRIES

Richard G. Tessendorf was elected a vice president of Aluminum Industries, Inc., Cincinnati, Ohio, at the annual meeting of the board of directors.

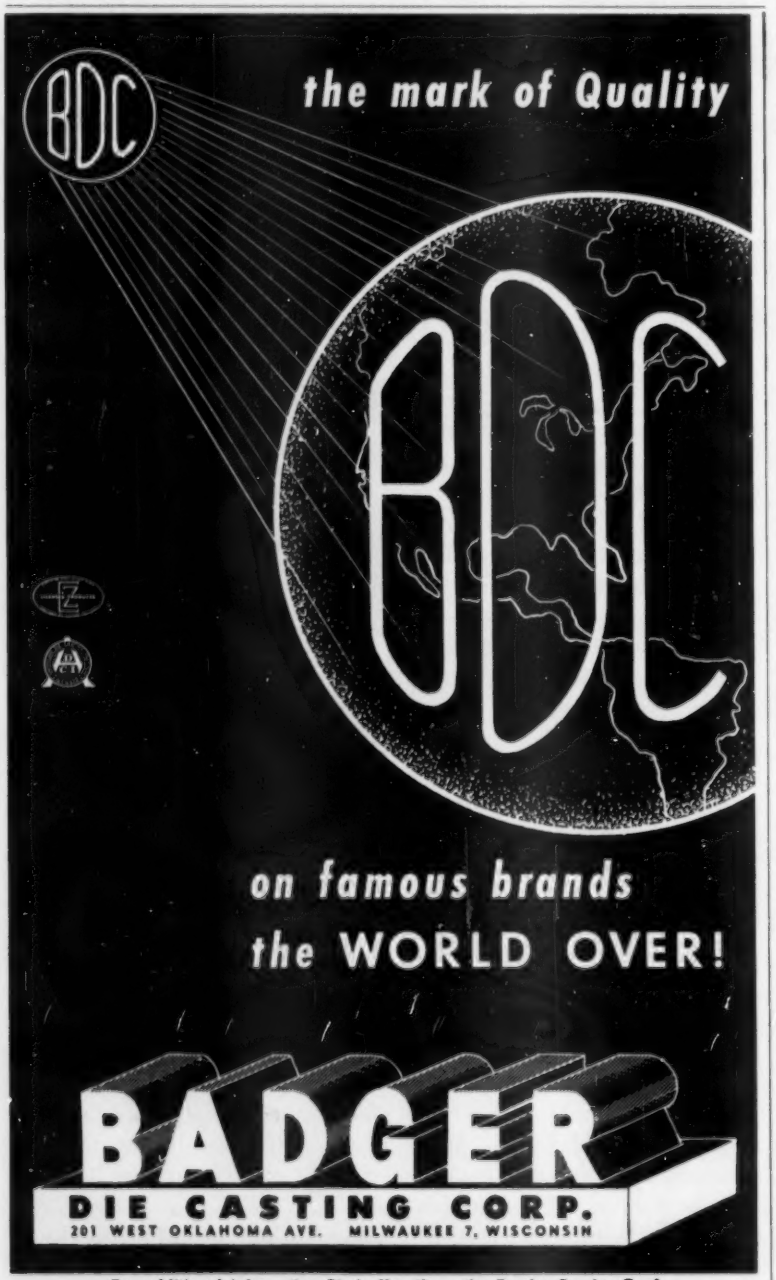
A native of Cincinnati, Mr. Tessendorf began working for the company in 1933 in the time-study department. Advancing through production and sales offices, he was elevated in 1952 from sales manager of the manufacturing division to the position of general works manager of all plant operations.

Richard G. Tessendorf

Mr. Tessendorf is a vice chairman and director of The Aluminum Association and an active member of the Society of Automotive Engineers.

LEAVE FOUNDRY SERVICES

Samuel Frankel has sold his interest in Foundry Services Inc., New York, N. Y. and Frankel has resigned as president and director and Herbert A. Frankel as secretary and director. Both have been retained in a consulting capacity.



For additional information Circle No. 42 on the Reader Service Card

AMPLEX EXPANDS FACILITIES FOR OILITE

Chrysler Corporation's Amplex Division is expanding its facilities for increased production of Oilite self-lubricating parts, A. J. Langhammer, president of Amplex, has announced.

Production of Oilite parts began last month in the division's new plant at Trenton, Mich. The new facility, which was constructed earlier this year for production of defense materials, is now being equipped with presses and machines for the new civilian work.

In the first 10 months of 1953, Langhammer said, output of Amplex products has increased 25 percent over last year. He said indications are that the Amplex Division will have the second best production year in its 25 year history, surpassed only by its peak output year of 1951.

Langhammer said that Amplex supplies more than 16,000 customers in almost every type of industry with Oilite parts such as oil-cushioned, self-lubricating bearings, finished machine parts, cored and solid bars, permanent filters and other specially designed parts.

SINGLETON NAMED SECRETARY OF MAG GROUP

The Magnesium Association has announced the appointment of Jerry Singleton as executive secretary. The announcement was made by James Kirkpatrick, president of the Association and vice president of Brooks and Perkins, Inc., Detroit. Mr. Singleton joined the Association January 1 at its executive offices, 122 East 42nd St., New York, N. Y.

Mr. Singleton for the past three years has been executive secretary of the Advertising Typographers Association, New York. He was, for a number of years, assistant manager of the Pressed Metal Institute, Cleveland.

CONSOLIDATE AVCO DIVISIONS

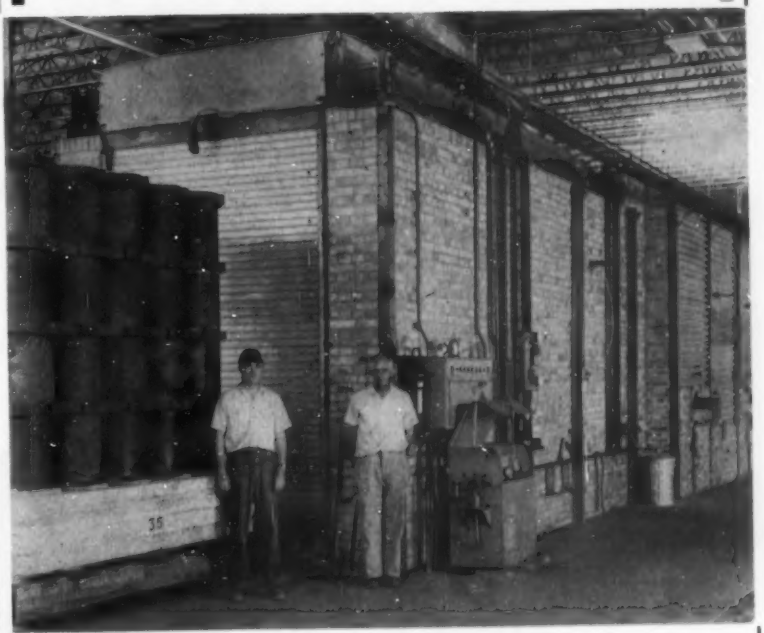
The consolidation of Lycoming-Spencer and Bridgeport-Lycoming Divisions of Avco Manufacturing Corporation into a single Lycoming Division has been announced by Victor Emanuel, chairman and president of Avco.

S. B. Withington will be general manager of the new Lycoming Division and will continue as vice president of Avco.

The consolidation move, Mr. Emanuel disclosed, has been effected to simplify Lycoming administration, expand and integrate research and strengthen its competitive position in the fields of engine and precision parts manufacture, foundry production and other operations.

HOEGANAES

Sponge Iron Powder



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METAL BORIDE RESEARCH TO BE EXPANDED BY 3-COMPANY PROGRAM

Three well-known companies have united forces to expand the activities of the Borolite Corporation, which was recently formed to pursue research and development of various metal borides ("Borolites") for high temperature military and civilian applications, according to a joint announcement by the presidents of the three cooperating companies — Kenneth D. Mann, of Firth Sterling Inc., Pittsburgh, Pa.; Dr. Paul Schwarzkopf, of American Electro Metal Corporation, Yonkers, N. Y.; and Major General Clinton F. Robinson, of The Carborundum Company, Niagara Falls, N. Y.

All three companies had previously engaged in separate research and development programs for atomic age materials. The joint statement said

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the Borolite Corporation was formed to concentrate funds and facilities for faster and broader development of new high temperature materials desperately needed by government and industry.

American Electro Metal Corporation has assigned to the Borolite Corp. all patents, compositions, processes and techniques relating to borolite materials, and will provide research and some pilot plant production for the new company.

The Carborundum Company will draw upon its experience with abrasive, refractory, and powdered materials to produce and manufacture various borides.

Firth Sterling Inc. has production know-how and equipment for certain powder metallurgy processes, and will fabricate borolite products.

Borides, carbides, and aluminides, all part of the program, show promise of withstanding operating temperatures ranging from 1600-2000F. for turbo-jets and up to 7000F. for rocket nozzles and intermediate applications.

Dr. Schwarzkopf pointed out that while the Air Force supported research on aluminides, the Office of Naval Research, since 1946, has allotted large sums of money for boride research, not only because borides retain a great part of their strength at temperatures in excess of 2500F., but also because they are composed of non-strategic materials.

Civilian uses of borides, which are combinations of boron with such metals as zirconium, chromium, and molybdenum, appear to be in crucibles for melting metals, protector tubes for thermocouples, atomizing nozzles for metal spraying equipment, and electrical contacts — because of the borolites' excellent electrical conductivity, hardness and erosion resistance. Some borolites also possess light weight per unit volume and excellent resistance to oxidizing atmospheres.

In the initial stages the three participating companies will manufacture the borolite products which will be marketed by the Borolite Corporation with headquarters in Niagara Falls, New York.

ANNOUNCES SCHOLARSHIPS

A scholarship award plan to "foster interest in the rapidly expanding field of industrial hydraulics" has been announced by W. C. Denison, president and chairman of the board of the Denison Engineering Co., manufacturer of hydraulic presses and components.

The annual award is under the auspices of the William C. Denison, Jr. Foundation, and will be awarded annually to one or more graduates of Franklin County (Columbus,

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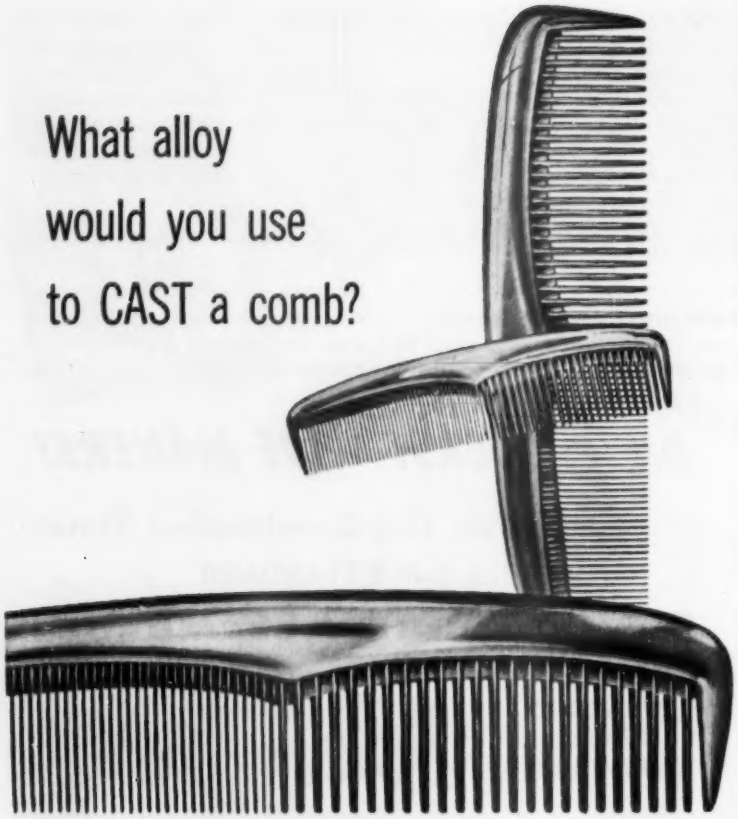

Remember, you have plenty of thin walls. You need fluidity . . .
and how! You need a high tensile, too,
so the comb's user doesn't get a scalp full of teeth.

Probably you'd use a standard 12% silicon-aluminum alloy.
You could, but you can do it *better and for less money* with Federated
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The exceptional fluidity of F-4110 makes it ideal for thin-walled,
complicated castings. Resistance to hot cracking is high.
The tendency to weld to the die is minimum.

An F-4110 casting is easier to machine.
Also it has a much whiter finish after polishing.

Remember, too, F-4110 is *lower in price*
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Ohio) high schools with the possibility of a second award being available to a graduating student with a parent in the employ of the Denison company.

Winners have a choice of colleges, but they are to select a course of studies in hydraulics, or in engineering with special hydraulics emphasis.

NEW MILLION DOLLAR METAL CARBIDES PLANT

The Metal Carbides Corporation, Youngstown, Ohio, is constructing a new 40,000-sq. ft. plant on a 25-acre site at 6001 Southern Blvd., Youngstown, Ohio. The new plant will be in operation in January, 1954, and will be used to produce tungsten carbide metal, including tool tips, die nibs, bar stock, rings, bushings and special shapes.

Size and capacity of equipment will enable tungsten carbide metal to be mass produced on a scale not heretofore possible. In addition to tungsten carbide metal, tantalum carbide and titanium carbide will also be produced, as well as tungsten alloy heavy metal, cermets and high temperature alloys, all produced by powder metallurgy methods.

The above new facility will be operated in addition to the main plant at 107 E. Indianola Avenue, Youngstown, Ohio, which will continue in operation. Total manufacturing space of all plant facilities will be approximately 100,000 sq. ft. All operations from ore and oxides to finished products are performed at Metal Carbides.

Powder metallurgy methods, employing both the sintering process and hot-press method, are used to produce dies, tools, rolls and other parts up to diameters of 25", lengths up to 40" and up to 1,000 pounds weight per piece.

OPPORTUNITIES

MANUFACTURER'S AGENT: Well established for 20 years in the New England territory with offices in Bridgeport, Connecticut, desires to represent competent die casting company producing zinc, aluminum and, possibly, magnesium parts. We have a clientele of A-1 customers. Write to Box No. 1154, PRECISION METAL MOLDING.

COPPER, Nickel, Chrome Plating Plant for sale in Central Indiana. Plant is equipped with semi-automatic copper and nickel tanks, continuous filtration with modern chrome facilities. Building contains 17,500 square feet, 35% of which is occupied by plating department, the balance available for manufacturing. Concrete block building, available Plant could put in operation at ample electricity, water, steam and labor once. Owner plated automotive die cast parts in substantial quantities and vacated plant because facilities were outgrown. Write to Box No. 1254, PRECISION METAL MOLDING magazine.

SALESMAN to call upon precision foundry trade, metallurgist or one with actual steel melting experience required, remuneration good. Write Box No. 1354, PRECISION METAL MOLDING magazine.

MANUFACTURERS REPRESENTATIVE WANTED for two territories: New England and Michigan. To handle aluminum die castings for midwest foundry with complete facilities for secondary operations. Write Box No. 1454, PRECISION METAL MOLDING magazine.

MANUFACTURERS REPRESENTATIVE with established New England following desires another line of precision metal parts. Engineering-trained personnel now selling mostly to electronics, electro-mechanical, and instrument industries. Must have substantial production facilities available, and offer exclusive territory. Write PRECISION METAL MOLDING Box No. 1554

WANTED: Man with production background to head up Powder Metals Division. Knowledge of powder metallurgy and costs desirous but not necessary. Write PRECISION METAL MOLDING Box No. 1654

W. T. McCARGO HONORED

W. T. McCargo, Carborundum Company, Niagara Falls, N. Y., has been awarded a certificate of service by the American Standards Association in recognition of his work in the development of American standards.

R. M. Gates, president, Air Preheater Company, New York, and chairman, the executive committee of ASA, in presenting the certificate, said: "The rules you have set up for the development of standards have made your procedures nationally and internationally known for their democratic character. You protect minorities — you thwart selfish interests. Your court, now in session for 35 years, has established a reputation for integrity of the highest order; impartiality; and consideration for the good of the national community."

DEPENDABLE SUPPLY
continued from page 37

coating just a coating of appropriate fluxes, it would be necessary for the welding rod manufacturer to maintain a stock of each of the many nickel-chromium-iron alloys that are used.

continued next page

LIGHT, STRONG and LOW COST ACCURATE Magnesium Die Castings

...save up to 40% in weight and are lower in cost than heavier metal castings

ACCURATES' magnesium die castings helped a leading manufacturer of coin operated phonographs to new production economies. Weight was reduced without sacrificing strength and at today's metal prices, castings were produced at a lower cost. Cast to close tolerances they require little or no machining . . . take a fine finish and cost less to handle all through production.

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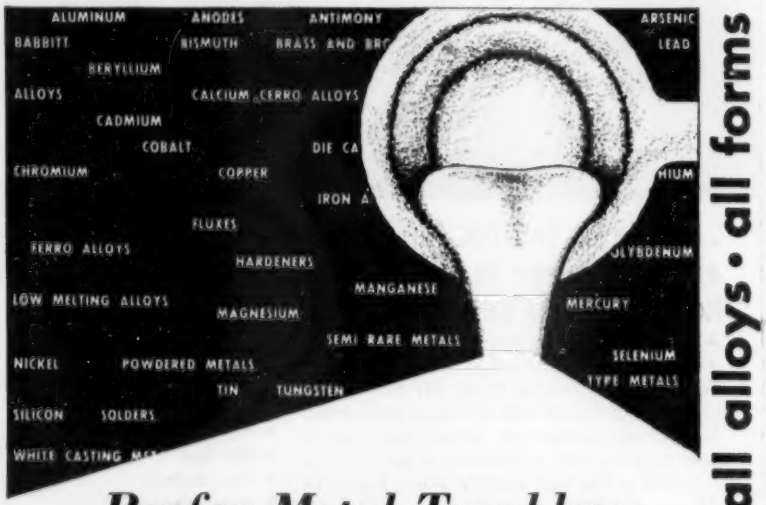

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DEPENDABLE SUPPLY — cont.

A variety of metal powders is available for addition to the familiar base metals for the purpose of introducing special properties. Depending upon the fabricating techniques used, almost complete diffusion can be attained in which case the composite structure can be called a true alloy. There are other instances in which it is not desirable to imitate a fusion metallurgy alloy, but instead to produce a structure which has unique properties based upon the existence of the individual unalloyed constituents. Probably the best example of an industry somewhat dissimilar from powder metallurgy, but in some ways allied to it, is the metallic friction material industry. Closely akin to this is the industry providing composite grinding wheels combining metal powders and abrasives.

Battery Plates

An interesting use of a metal powder is the manufacture of the battery plates in the nickel-cadmium storage battery. A very low density nickel powder is sintered on a supporting member providing the desired very large surface area.

Some of the softer, low melting metals and alloys are mixed with greases to form pastes. The four principal examples of this are lubricants in wire drawing operations, heavy duty lubricants for general application, solder pastes for the joining of assemblies and metallic caulking pastes for the filling up of gaps and joints and other imperfections in an article prior to finishing.

Metal powders are used extensively as reagents or as catalysts in organic chemical reactions where they are either consumed or are gradually worn away through repeated circulation in the system. The

new fluid bed catalyst technique utilizes, among others, metal powder catalysts.

Aluminum Powder Users

Probably the largest metal powder production in the country today is aluminum powder and three important non-powder-metallurgy uses of this raw material should be mentioned. From a military standpoint, aluminum powder, which like aluminum pig, can be thought of as packaged energy, is of vital importance. In one of these applications, this packaged energy is contained in a bomb or torpedo war head, or a depth charge, or a submarine mine. Triggered by the ignition of the other ingredients of the charge, this pent up energy is violently released and the duration of the explosion lengthened. Also, from a military, as well as a commercial point of view, another use of this packaged energy is very important, in that aluminum, which is plentiful, when applied in the form of powder can reduce the oxides of other less plentiful metals and produce them in form usable by the alloy steel industry. Several important alloy addition agents that are so made are chromium, manganese and vanadium. This is an adaptation of the Goldschmidt process in which a mixture of aluminum powder and iron oxide is ignited to form a supply of molten iron which can be used for welding large shafts in place and other massive repairs of this type.

The third very important use of aluminum powder is as the raw material for the manufacture of aluminum paint pigment. The use of aluminum paint is expanding as more and more people realize the potentialities of its light and heat reflectance, its resistance to corrosion over long life blessed by the virtue of an attractiveness not found in any other paint pigment normally used for strictly protective purposes.

Three metal powders are used in combination with poured concrete to obtain special effects. They are:

1. Aluminum powder added to the mix where it reacts with the alkaline water to release hydrogen which aerates the setting concrete and materially lightens the weight of the slab or the blocks.
2. Copper powder added to concrete mixes for the pouring of floors in hospitals, dairies, shower stalls, locker rooms, etc., to provide non-sparking and fungus resisting properties. A strength increase is an added benefit.

continued next page

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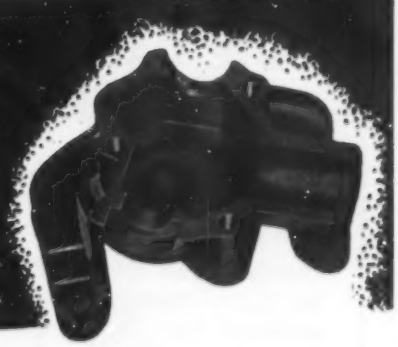

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DEPENDABLE SUPPLY — cont.

3. Iron powder is troweled into the setting surface of concrete floors to improve resistance to wear.

Another use of iron powder is in the cleaning of seeds of field crops—grains particularly. The seed is tumbled with the iron powder. The seeds of some important weeds are sticky and adhere to the iron powder which does not attract the slippery grain seeds. Passing the mixture over a magnetic separator removes the iron weed-carrier which is rejuvenated for reuse.

Flame Scarfing

A substantial tonnage of iron powder is consumed in the flame-scarfing and flame cutting of stainless and other high alloy steels. In this application iron powder is added at the point of combustion of the familiar oxyacetylene cutting torch while making the cut or the scarf. Its use contributes greater heat to the flame and its oxide aids in fluxing the refractory chromium oxide formed in the operation. On some occasions aluminum powder is mixed with the iron powder, generating more intense heat. Although originally designed for high alloy steels, the increased speed of cutting is causing the adoption of this practice in an increasing number of grey iron foundries for the cutting of gates and risers.

The use of metal powders as starting materials for metallic pigments was mentioned in the case of aluminum. It is important, though in lesser tonnages, in the copper and copper base alloy field of gold bronze powder manufacture. A specialized pigment is silver flake, the use of which in the production of the printed circuit (an important feature in miniaturization) was given great impetus by the needs of World War II. Many ingenious applications of this pigment

have since been made. The importance of this application is out of all proportion to its tonnage and is a vivid illustration of the fact that a vigorous industry supplying basic raw materials exists to undertake those very special jobs that would not be possible if the manufacturing technique had not been perfected on really commercial items. As the base of the metal powder industry broadens, an ever increasing number of these technically vital products will become available even though their manufacture as isolated products would not be considered commercially justifiable.

BAYONET LOCK
continued from page 36

the cost of tooling, this method of manufacture is considerably less expensive than the previous technique of turning the shapes on a screw machine, soldering the hollow stem into position, and fastening the assembly by means of a lock ring.

Phoenix Die Casting Company has been producing these pieces for Gomco since they were originally designed. The original set of dies would still be in use today, except for design changes in the parts two years ago.

Finish on these castings is critical — they are part of equipment used in the operating rooms of hospitals, and therefore need the highest quality chromium plated surface. Gomco finishes these castings in its own plating department, giving a conventional copper-nickel-chromium cycle. Good quality casting surface and careful hand polishing give a satisfactory base for the plating operation.

Up until recently, these two small die castings were the

continued next page

If your product should be . . .

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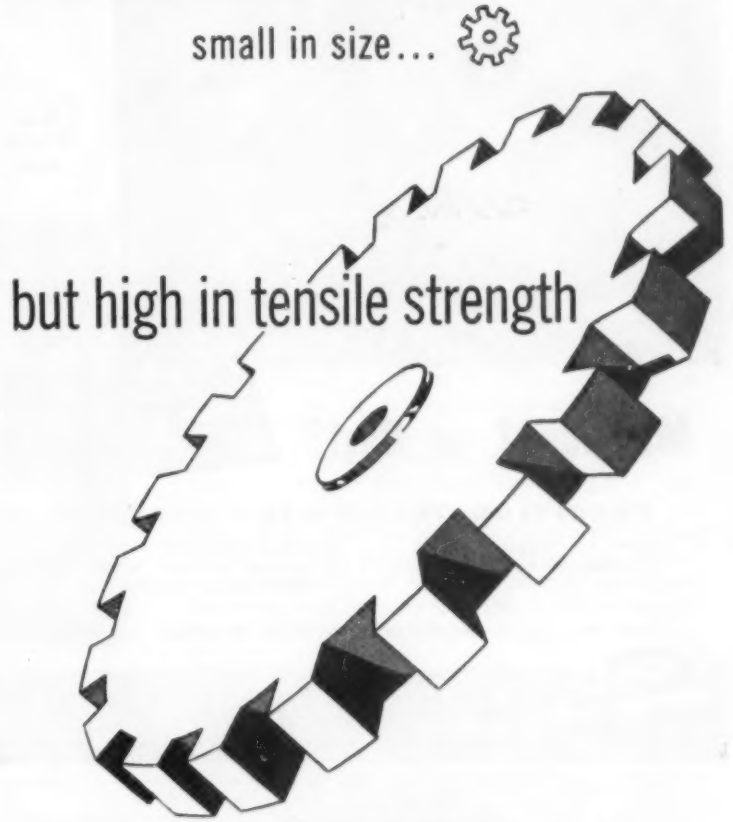

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Combined with iron powders, Metal Hydrides' chromium-nickel pre-alloyed powders will assure a maximum of tensile strength with a minimum of size in your product. Equally important is the fact that the ultimate in results and utmost satisfaction can be achieved with a very low percentage of MH chromium-nickel pre-alloyed powders.

Write now for complete information of iron powders with alloys of varied chromium-nickel contents. Your inquiries will receive prompt, interested attention. Specify Bulletin 800-A.

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For additional information Circle No. 35 on the Reader Service Card

DIE CASTING FOR MEDICS — cont.

only pieces produced by this method for Gomco. Production volume is not large, there being only about 5,000 hospitals in the United States having 100 beds or more. Now, however, the rising cost of secondary operations has caused the company to reexamine other components for production by die casting.

Two additional parts are currently being tooled up for die casting, one in zinc and the other in aluminum. In each case lower costs are estimated and, it is believed, improvements in design detail can be incorporated which would otherwise be impractical.

This is indicative of a trend toward the introduction of castings which are received with close dimensions to replace heavily processed sand castings and machined parts, even where production volume is limited.

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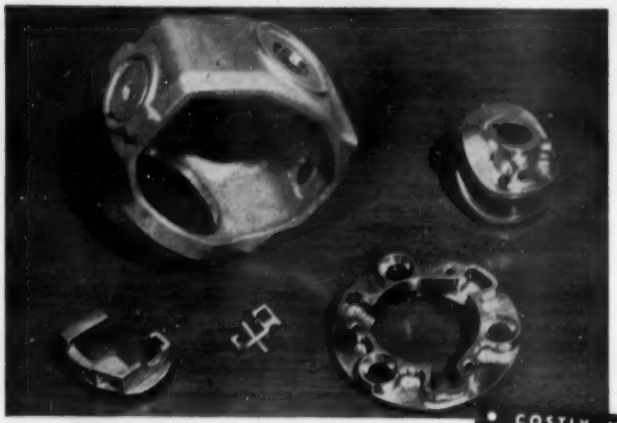

Scale ½"=1½ App.

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• COSTLY MACHINING OPERATIONS WERE COMPLETELY ELIMINATED BY CASTING THESE PARTS BY THE "LOST WAX PROCESS."

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- cast centrifugally
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- non-ferrous only
- sample delivery three weeks from receipt of order

Send blueprints or samples to Home Office for prompt quotations.

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All master melting alloys processed by Cannon-Muskegon are completely cleaned before shipment to the customer. This removes oxide and other non-metallics, insuring a remelt alloy to your exact specifications. Cannon-Muskegon's washing and tumbling service is exclusive in the industry, but is only part of the extra service you receive when you send your investment casting metal specifications to certified alloy specialists.

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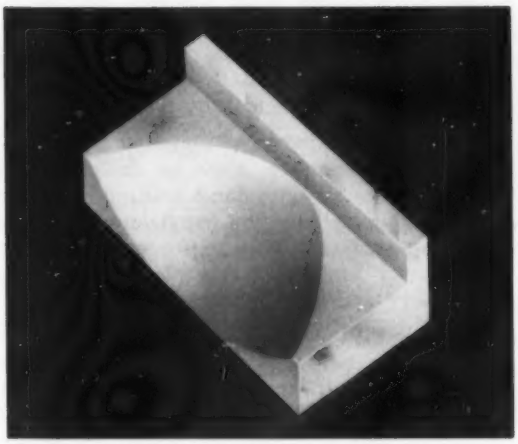
SIMPLIFIED SOLUTIONS

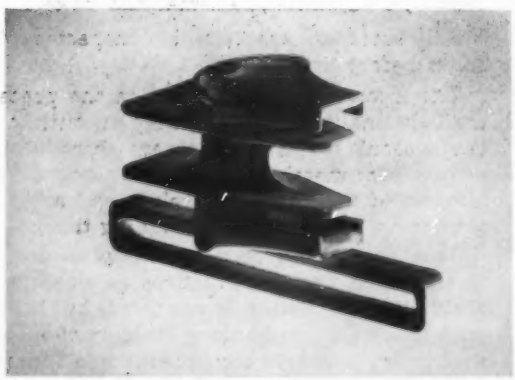
for production problems



THE USUAL REASON for making a part by investment casting is because it is less costly or, in a few cases, because no other method of production is possible. Now comes a new advantage confered by investment casting — magnetic tolerance control.

The microphone pole piece shown is cast in 1020 steel by Casting Engineers, Inc., and to meet the magnetic specifications of the customer the carbon content must be held within 0.04 percent. Normal casting methods could not hold this specification and machining from bar stock to the shape shown was economically unsound.

SAVING OF OVER 40 PERCENT has been shown by converting to shell molding as a manufacturing method for the "Phantom Drain" illustrated. Threads are used as-cast, bolt holes are held to 0.005 between centers, and the gasket surface is held flat within 0.012 TIR. The smoother interior surface achieved by the shell molding process increases the efficiency of water elimination. Only minor grinding, to remove flash and gates, is required on this drain to ready it for use. Using a two cavity mold the foundry, Woodruff & Edwards, Inc. is able to produce over 600 castings per shift.



MADE AS A BRONZE investment casting because of strength requirements, this slide for a slide-fastener is being fabricated by the Investment Casting Co. of Meadville, Pa. For use on a rubber flying suit, the slide must compress the edges of the rubber so that they seal when the suit is pressurized. A pull of 35 lbs. must be used, all of which is carried by the thin wall betwen the two slides. This high load is the factor that precluded the use of zinc or aluminum die castings. The die for making the disposable pattern has 32 cores and cost $8000.00 to build.

There must be something significant in the **fact** that manufacturers keep coming back to LITEMETAL DICAST for *repeat* jobs. For example: In 1948, Maxitrol Corporation placed its first order with L-D. Since then, in spite of the fact that it had tried other die cast makers, Maxitrol now has LITEMETAL producing 90% of its die castings. Similar repeat business has been enjoyed from Belden, Western Electric, Buick, Chrysler, Keller Tool, and many others prominent in their fields. Such repeat business illustrates better than anything else the fact that LITEMETAL's close friendly cooperation from engineering to shipping is appreciated by its customers. These manufacturers know they have to look no further for their die casting needs.

The die casting of the new light weight alloys—aluminum and magnesium—is a great saver of time, materials and much of the labor otherwise required for machining and finishing. In addition, the savings in weight often effect reductions of shipping costs. The extensive experience of LITEMETAL in such products as the spools and gas regulators shown above in *single* units of aluminum and magnesium has proved efficient and economical. Many other examples can be offered to an almost unlimited field of industrial uses and applications.

Let's Talk It Over . . .

LITEMETAL DICAST, INC. is an organization of specialists — men thoroughly experienced in the casting and machining of magnesium and aluminum alloys. Our equipment includes big machines for big jobs — little machines for little jobs . . . the right sizes and types of the most modern die casting equipment for producing parts from the size of a button to large cable spools. Complete facilities for secondary operations are also available.

Write today for literature and design information. Quick action on inquiries.

LITEMETAL DICAST Inc.

A DIVISION OF HAYES INDUSTRIES

1925 WILDWOOD AVE · JACKSON, MICHIGAN

PLANT AND EXECUTIVE OFFICES

For additional information Circle No. 49 on the Reader Service Card

DENTISTS BUY IMPROVED UNITS
continued from page 35

Die castings have given the exact contours called for, even on such components as the table arm support bracket, Figure 3a, which has two surfaces with 100-inch radius that would be difficult to hold accurately by stamping. Blending of radii and gradual change from one contour to another, are produced without difficulty by die casting.

Each of the three castings in Figure 3 is a supporting member, each is designed with shape that will withstand loading, and each is distinguished by the provision of relieved bearing surfaces. This improves the bearing design by making full surface contact unnecessary and also lightens the metal.

Another place in which the use of a die casting has helped to provide functional improvement is the cup holder, Figure 4. This chromium plated zinc die casting is cast to strict weight tolerance. An important feature of the Ritter Instru-Matic is its automatic water supply which fills the cup with water automatically and shuts off when the cup is two-thirds full. To permit this, the die cast cup holder is produced to 5 oz., ± ½ oz.

In addition to its facilities for machining and assembling, the Ritter Company also has extensive paint finishing equipment. As can be readily understood, the quality of finish on dental equipment is very critical. It must be smooth, hard, durable and uniform.

Die castings that appear on the exterior of the Instru-Matic are given the following cycle of finishing: degrease in a 3-stage vapor degreaser; phosphate dip; rinse; chromic acid dip; spray a primer coat 1½ mils thick; sand the surace with a 360 grit abrasive, removing about a half mil of the primer; spray about 2 mils of a synthetic enamel and bake.

All surfaces are closely inspected for flaws before assembling.

The information introduced in the preceding columns is intended to give an outline of the reasons for Ritter's recent introduction of precision metal molded parts, along with a glimpse of the parts themselves and some of the factors considered in designing them.

This application of die castings is unique in that such unusual practices as welding of aluminum die casting is practiced, but otherwise follows a trend among builders of special machinery to obtain components in a finished or semi-finished condition, thus gaining economy in production.

YOU CAN USE LEAD
continued from page 39

should be noted that this same need for change exists in permanent molds also.

Normal die casting tolerances are easily held when casting lead and cores as small as 1/32 diameter are regularly employed. Surface finish in pure lead is not very good and some cold flow lines are generally found. This condition improves when lead is alloyed with antimony.

At the present time, the maximum sized piece that can be die cast by us* is about one pound, including the gate and riser. In permanent mold casting using steel molds, parts weighing up to 500 pounds have been cast by us in metal molds.

The present economical limit to centrifugal casting, using rubber molds, is about a one pound shot. However, a relatively new phase of centrifugal casting has been developed by the investment casting process whereby aluminum centrifugal casting molds are now being fabricated.

*Others can probably die cast heavier pieces.

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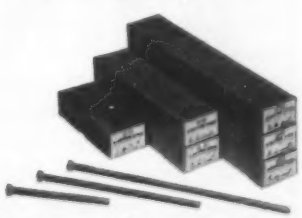

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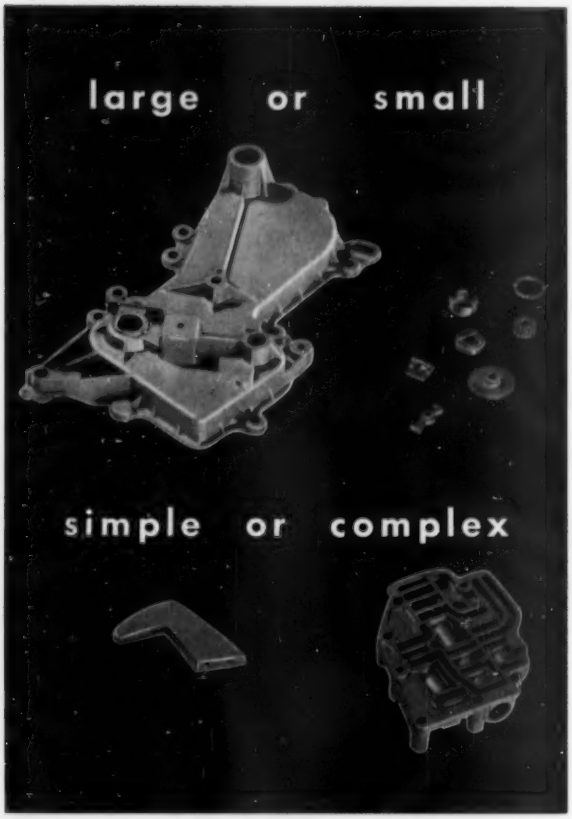

PARAMOUNT DIE CASTINGS

CUT MANUFACTURING COSTS

Yes, we produce castings of many shapes and sizes, some very intricate and others simple in design. But, regardless of size and shape, you can depend on PARAMOUNT to give you strong, clean castings, uniformly accurate to close tolerances to reduce your machining, finishing and assembly time.

We offer a complete service of design and engineering, die making, production and machining.

We invite you to consult with us on your die casting needs. Your inquiries are welcome.

Descriptive literature will be mailed on request.

ALUMINUM AND ZINC DIE CASTINGS

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DIE CASTING COMPANY
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Circle No. 52 on the Reader Service Card

METALS DISINTEGRATING NAMES TWO NEW VICE PRESIDENTS

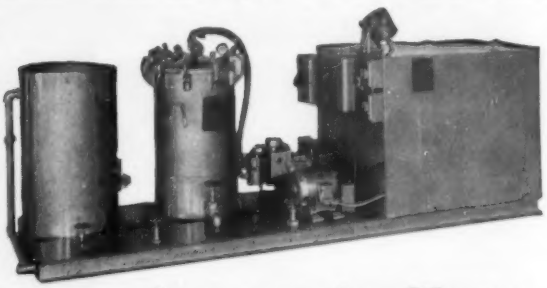
H. E. Hall, president of Metals Disintegrating Co., Elizabeth, N. J., has announced the election of Harold E. Collins and William O. Faxon as vice presidents of the company.

Mr. Collins has been named vice president in charge of the company's marketing operations in its abrasives and pigments divisions; Mr. Faxon has been promoted from works manager of the company's Harrison Abrasive Div., to the post of vice president in charge of manufacturing.

ELECTED DIRECTOR OF BRITISH FIRM

Dr. Paul Schwarzkopf, president of the American Electro Metal Corporation of Yonkers, N. Y., has been elected to the board of directors of George Cohen (Sinteel) Limited of London, England, a new company which will introduce in England the production of ferrous structural parts from powders. Sinteel is a subsidiary of George Cohen Sons and Co. Limited and its associated concerns, England's largest producers of iron and steel powders.

The purpose of the British corporation is to emulate American leadership in the field of ferrous powder metallurgy. United States production of iron powders is expected to reach 3,000 tons a month early next year, almost three times as much as the year before.



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For low-cost, efficient impregnating of porous and leaking pressure castings, either ferrous or non-ferrous metals, use our MOGULLIZING Vacuum-Pressure System. The MOGULLIZER is made in all sizes from the small laboratory models of one cubic foot to the large industrial units with 100 cubic feet or more auto-claves (impregnating tanks). We obtain 29.5" or more of vacuum with this machine.

MOGUL Cast Seal is recommended with these units for impregnating all types of castings. No after-baking required.

Send us your problem and ask for booklet: "Mogul Cast Seal Impregnating Process"

METALLIZING COMPANY OF AMERICA
Dept. PMM
3520 W. Carroll Avenue • Chicago 24, Illinois

Circle No. 74 on the Reader Service Card

ELKANN RETIRES AS PRESIDENT OF CANADIAN FIRM

Directors of Vanadium-Alloys Steel, Canada, Limited, meeting at the home office in London, Ontario, recently accepted the resignation of Company President, Jean Paul Elkann, elected three men to fill executive posts with the firm.

In accepting Mr. Elkann's resignation, directors of the Canadian tool steel company, cleared the way for the former president to devote full time to European interests of Vanadium-Alloys Steel Co., Latrobe, Penna.

Three men elected to key positions are:

J. P. Gill, vice president of Vasco Canada, and executive vice president of Vanadium-Alloys Steel Company, was elected president of the Canadian company, filling the unexpired term of Elkann.

L. D. Bowman vice president in charge of operations for Vanadium-Alloys was elected vice president of the Canadian company.

Burns George, vice president in charge of sales in the organizational structure of Vanadium Alloys was elected a director, likewise filling a vacancy on the board.

NEW WEST COAST REP

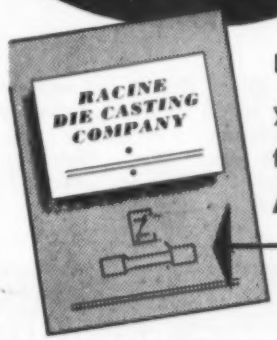
Lowell Harrison Miller, well known for many years to industrial finishers, today was named a Pacific Region industrial representative in Los Angeles for The Glidden Company, it has been announced by Thomas N. Armel, National Industrial Sales Manager.

HEADS PHYSICAL METALLURGY

Dr. Adolph J. Lena has been appointed associate director of research at Allegheny Ludlum Steel Corporation, in charge of the physical metallurgy section of the research department. He was formerly research metallurgist.

Circle No. 78 on the Reader Service Card

Looking For A Dependable Die Casting Service?



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Send for our new, free brochure.

RACINE DIE CASTING CO.

1500 16th St. • Racine, Wis.

Are you receiving our monthly house organ — THE HENNING MESSENGER? We know you'll get a kick out of the contents and suggest you ask to be placed on our mailing list.

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Zamak (Zinc Base) Die Casting Alloys

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Our alloys meet all Government, ASTM and SAE specifications.

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"DEPENDABLE SERVICE SINCE 1922"

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REFERENCE MATERIAL
continued from page 16

79. DECREASE COSTS and increase the speed of your deburring opeartions with Nobur Mfg. Co.'s rotary tools. Their descriptive literature gives full details.

80. HIGH SPEED TAPPING HEADS are the subject of a booklet from Procunier Safety Chuck.

82. PRECISION GROUND AND HARDENED ejector pins from Detroit Mold Enginering Co. will lower die costs. Data sheets from the company gives sizes, types, etc. available from stock.

83. STANDARD CAVITY RETAINER sets and ejector boxes are described and listed in the Detroit Mold Engineering Co. catalog.

here's how BIG INDUSTRIES SAVE on SMALL PARTS
AUTOMOTIVE parts
APPLIANCE parts
DIE CAST BY GRIES IN ONE OPERATION
TIMER parts
VALVE parts
GRIES DIE CASTINGS CAN SOLVE YOUR SMALL PARTS PROBLEMS TOO—IN ONE OPERATION!
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SMALLNESS UNLIMITED
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For additional information Circle No. 45 on the Reader Service Card

10. DIE CASTING MACHINE specifications are in a catalog from Cleveland Automatic Machine.

30. BOTH FINISHING TIME and finishing labor can be reduced through the use of Port-A-Belt grinding attachments, described and illustrated in a folder from The Carborundum Co.

40. PREVENTING THREAD stripping in die cast metals and other materials is explained in literature from Groov-Pin discussing their Tap-Lok inserts.

34. BASIC ENGINEERING DESIGN information together with application data and a description of the investment casting process is contained in a new booklet from Hitchiner Mfg. Co., Inc.

75. A BOOKLET by Ohio Precision Castings, Inc. gives interesting cast histories of plaster mold casting applications.

81. BARREL FINISHING using the Rampe Mfg. Co. twin barrel machine is fully described and illustrated in literature available from the company.

38. CREATIVE CASTINGS, a description of the facilities and some of the many parts made by Thompson Products, Inc., Light Metals Div. is available in brochure form.

31. DETAILED LITERATURE on Unichrome, bright chromium, has been published by United Chromium, Inc.

CONSOLIDATE FOREIGN SALES

Charles Hardy, Inc. producers and distributors of metal powders and importers of stategic materials, announce consolidation of all foreign sales activities with their new International Department.

John D. Dale, president, has announced the appointment of E. L. Hoeflich as manager of the International Sales Department who will specialize in the world-wide distribution of selected group of machinery and industrial equipment.

Mr. Hoeflich, formerly associated with the American Steel Export Co. and O. Philipps Co. has been actively engaged in international trade since 1925.

ADVERTISERS' INDEX

JANUARY 1954

A

Abbott Ball Co., Inc. 73
Accurate Die Casting Co. 83
Acheson-Colloids Co. 43
Ajax Engineering Corp. 53
Allied Research Products, Inc. 72
Almco Div,, Queen Stove Works Inc. .. 71
Aluminum Smelting & Refining Co. Cover 2
American Chemical Paint Co. 62
American Die Casting Institute 5
American Zinc Sales Co. 17
Apex Smelting Co. ..... Cover 4
Atlantic Casting & Engineering Corp. .. 6

B

Badger Die Casting Corp. 78
Belmont Smelting & Refining Works, Inc. 84
Behr-Manning Corp. 65

C

Cannon-Muskegon Co. 88
Carborundum Co. 61
Cast-Master, Inc. 1
Celanese Corporation of America, Chemical Division 7
Central Die Casting & Mfg. Co., Inc. .. 84
Certified Alloys Co. ..... Cover 2
Cleveland Automatic Machine Co. 14
Cleveland Hardware & Forging Co. 49
Crucible Steel Company of America ... 26

D

Detroit Mold Engineering Co. 81-91
Doehler Jarvis Div., National Lead Co. 46-47
Dollin Corp. 21

E

Ekstrand & Tholand, Inc. 79

F

Federal Die Casting Co. 76
Federated Metals Div., American Smelting & Refining Co. 82

G

Gries Reproducer Corp. 94
Groov-Pin Corp. 70

H

Henning Bros. & Smith, Inc. 93
Hitchiner Mfg. Co., Inc. 10
M. Holtzman Metal Co. 95
Hoover Co. ..... Cover 3
E. F. Houghton & Co. 2

Injection Molders Supply Co. 91
International Nickel Co., The 13

J

Jersey Plastic & Die Casting Co. 76

K

Kaiser Aluminum & Chemical Co. 28

continued on page 96

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For additional information Circle No. 47 on the Reader Service Card

INDEX OF ADVERTISERS

continued from page 95

Kuhlman Die Casting Co. 54
Kux Machine Co. 51

L

Lester-Phoenix Inc. 24-25
Lewis Welding & Engineering Corp. ... 27
Litemetal Dicast, Inc. 90

M

Maas & Waldstein Co. 69
Madison-Kipp Corp. 9
Mansfield Brass & Aluminum Corp. ... 88
Metal Hydrides Inc. 87
Metallizing Company of America 92
A. Milne & Co. 56
Milwaukee Die Casting Co. 80
Mt. Vernon Die Casting Corp. 18

N

Nelson Metal Products 74
New England Die Casting Co. 74
Newton-New Haven Co. 4
Nobur Mfg. Co. 64

O

Oakite Products, Inc. 67
Ohio Precision Castings, Inc. 80

P

Pangborn Corp. 60
Paragon Die Casting Co. 96
Paramount Die Casting Co. 92
Parker White-Metal Co. 29
Precision Castings Co., Inc. 15
Pressure Castings, Inc. 23
Procunier Safety Chuck Co. 64

R

Racine Die Casting Co. 93
Rampe Mfg. Co. 67

S

St. Joseph Lead Co. 20
Sonken-Galamba Corp. 86
Spincraft, Inc. 76
Sta-Warm Electric Co. 80
Stroh Die Moulded Castings Co. 86
Stroman Furnace & Engineering Co. ... 12
Superior Die Casting Co. 8

T

Thompson Products, Inc., Light Metals Div. 52
Thompson Products, Inc., Metallurgical Products Div. 30

U

U. S. Reduction Co. 19
United Chromium Inc. 58
Universal Die Casting Co. 65

Z

Z & H Mfg. Co. 88

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The Remington Typewriter base is a one-piece die casting made by The Hoover Company. It was designed as a die casting because this was the most economical way to produce the desired surface finish and because the complex shape of the item would make any other production method far too costly.
Remington

Solid base for savings

DIE-CAST by HOOVER

In 15 years several hundred thousand Remington Typewriters have been built on bases die-cast by The Hoover Company. As with many other leading American manufacturers, Remington Rand has found that die-cast parts mean faster, simpler assembly, improved product appearance and strength with elimination of dead weight.

If you use aluminum or zinc die castings, or if you think you *could* use die castings in your product, ask a Hoover engineer to call.

The Hoover Company
Die Castings Division
North Canton, Ohio

HOOVER

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ZINC

CASTING ALLOYS

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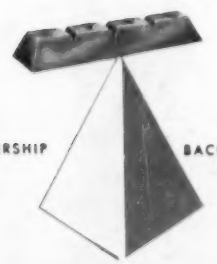
30th Anniversary Year



RESEARCH LEADERSHIP BACK OF EVERY INGOT

Send for our helpful booklet, "Die Casting Alloys." Shows composition, properties, other data on Apex products. No obligation.

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